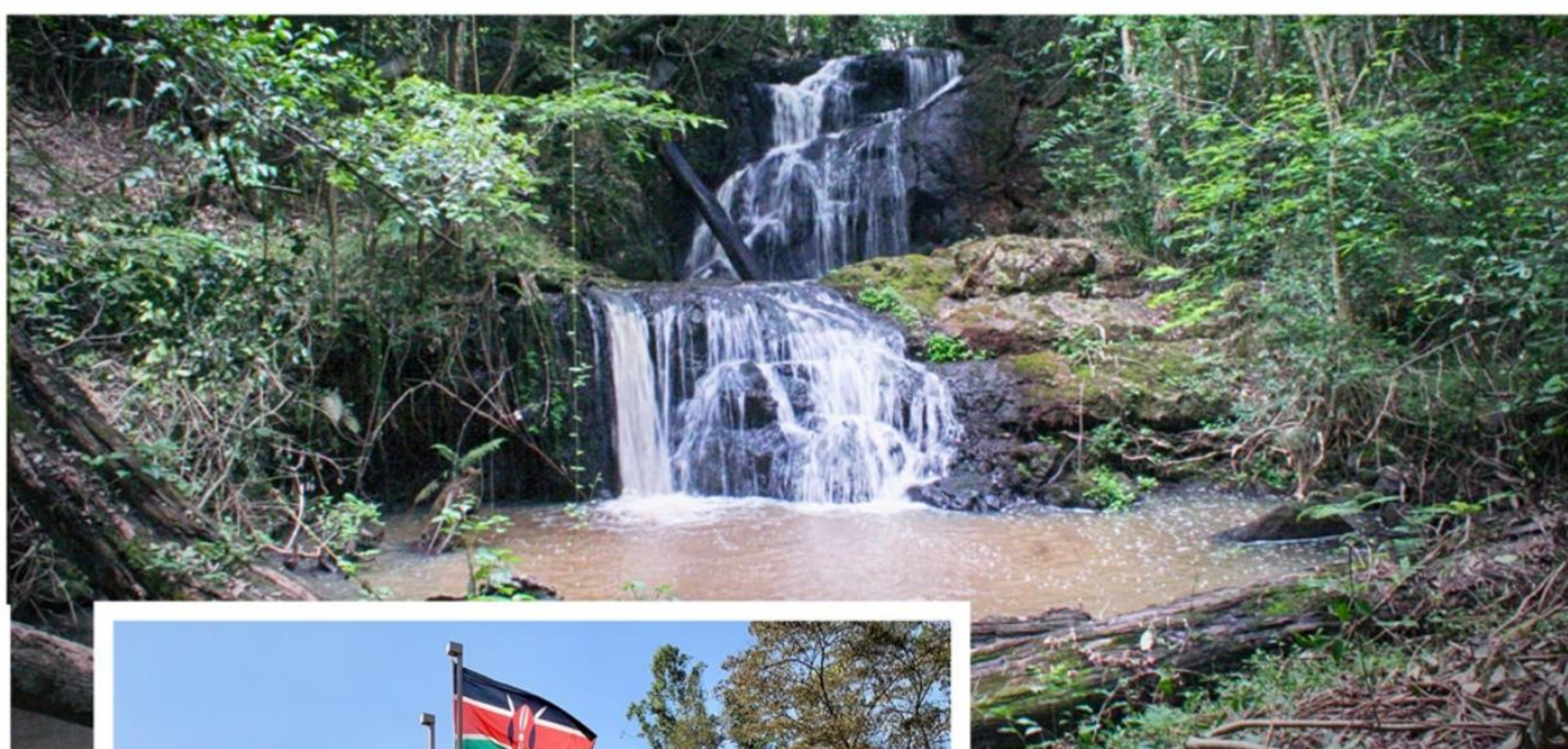


KARURA PARTICIPATORY FOREST MANAGEMENT PLAN 2021-2026



APPROVAL

KARURA PARTICIPATORY FOREST MANAGEMENT PLAN

This Karura Participatory Forest Management Plan is hereby approved. The plan may be amended as the need arises through mutual agreement of both parties. Its implementation will be guided by the Forest Management Agreement signed between the Kenya Forest Service and the Friends of Karura Community Forest Association and will be based on approved annual work plans.



Julius Kamau

Chief Conservator of Forests,

KENYA FOREST SERVICE

Date 26th April 2021

Cover Photos: (top) Aerial view of Karura Forest from overhead Junction 30 on Wangari Maathai Track showing proximity of Nairobi city centre on top right. (Clockwise from middle left): African Crowned Eagle, one of Karura's top predators; the Karura River waterfall; bushbuck male on the Family Trail; newly opened Karura Forest House; typical signage to help visitors get around (photos H. Croze).

DEDICATION

This management plan is dedicated to the late Professor Wangari Maathai, Nobel Peace Prize laureate and founder of the Green Belt Movement. Professor Maathai is internationally recognized for her persistent struggle for democracy, human rights and environmental conservation. In the 1990s, Professor Maathai challenged a planned settlement in Karura Forest Reserve, risking jail and bodily harm to preserve the forest for generations to come. If not for Professor Maathai's vindication and bravery, the trees and their ecosystem would not be there.

"I have invested 20 years of my life in this campaign for the environment and I'm still only scratching the surface. I am confident of winning. Nobody will build anything [in the forest] as long as we live. We cannot dignify theft."

— Prof. Wangari Maathai, rededicating herself to the fight to save Karura Forest, Nairobi, 2001



*Prof. Wangari Maathai, growing trees and future generations.
With Karura Primary School Girls, KFEET, Karura Forest, March 2010*

"When the land-grabbing happened, there was just one Wangari and a few others who were willing to risk their lives to stop the illegal developers, and Karura today is the result. I tell you if this happens in the future, it must be the voice of all Kenyans that rises in protest. And if you don't protest, you do a great disservice to your children and their children's children."

-- Prof. Wangari Maathai, on her last visit to
Karura Forest, March 2011

Planning Committee

FOREWORD

Karura Forest Reserve is situated in the outskirts of Kenya's capital city, Nairobi. This remarkable geographical location gives the forest a unique role in Nairobi and Kenya as an urban recreational conservation forest. The dense population surrounding the forest, including two informal settlements and several more affluent areas, has led to high demand for forest resources. These demands include ecotourism and recreation, fuelwood, water, and beekeeping. The Forest Conservation and Management Act, 2016 and the KFS Strategic Plan have ushered in a new era in forest management in Kenya, with a dispensation that allows the involvement of adjacent communities in forest management. This follows a similar shift in legislative change in other East African countries, such as Tanzania and Uganda. Contrary to past practice where management was centralised, many countries around the world have embraced a participatory approach to the management of forests, and the practice is now widely accepted as a sustainable way of managing natural resources.

A key requirement of the new legislation is that all forests will henceforth be managed in accordance with a management plan. In the Participatory Forest Management context, stakeholders are expected to prepare a Karura Participatory Forest Management Plan (KPFMP) to guide the process of managing the resources of the forest. To achieve this, the legislation has provided for the formation and registration of Community Forest Associations (CFAs). In Karura, this led to the formation of Friends of Karura CFA (FKFCFA). In order to prepare the participatory plan, a planning team was formed with its members drawn from all key stakeholders. Kenya Forest Service (KFS), FKFCFA and the Nairobi Conservancy Forest Conservation Committee (NCFCC) collaborated to prepare the first and second management plans for Karura forest as they have also done to draft this third management plan

It is hoped that by its adoption, sustainable management of the Karura Forest Reserve will continue to be realized. The FKFCFA Board wishes, together with the KFS, to celebrate the tremendous strides that have been made in conserving Karura Forest, providing a sterling example of successful participatory forest conservation and management. We look forward to even more cooperation and growth under the joint management plan with KFS in the years to come guided by our vision which is to make Karura Forest Reserve a world-class example of a sustainably managed and conserved, safe and secure natural forest.



Chairperson

The Friends of Karura Community Forest Association (FKFCFA)

Date 26th APRIL 2021

ACKNOWLEDGEMENTS

The development of this Karura Participatory Forest Management Plan has been a combined effort of different stakeholders which included the Kenya Forest Service (KFS), the community, and Friends of Karura Community Forest Association (FKFCFA)



Special mention goes to KFS staff led by Dr. Elizabeth Wambugu, the Head of Forest Management Planning, whose office provided the guidelines for revising management plan and also for organizing and improving the initial drafts. The LPRC would also wish to acknowledge the efforts of Mr. Francis Kariuki, Head of Nairobi Conservancy, Mr. Anthony Kinyanjui, Ecosystem Conservator Nairobi and Mr. Paul Musembi, the Forest Station Manager Karura for their invaluable advice throughout the plan preparation process.



The Local Plan Revising Committee (LPRC) would like to show its appreciation to the members of FKFCFA for their contribution, particularly Mrs. Cristina Boelcke, Mrs. Chantal Mariotte and Dr Harvey Croze from the FKFCFA, for their invaluable inputs and the sacrifice of their time and efforts to make the production of this plan a success.

Since it would be difficult to mention each and every stakeholder who in one way or the other took part in this noble work, all their efforts are highly appreciated and acknowledged.

EXECUTIVE SUMMARY

The forest covers an area of 1041.3ha and is comprised of two blocks namely Karura (including Mazingira) and Sigiria. The Karura Participatory Forest Management Plan (KPFMP) will be implemented over five years. Karura is an urban forest that caters for a wide clientele whose demands range from subsistence needs to recreation and aesthetics, for the poor and affluent respectively.

The vision of the KPFMP is to "keep Karura Forest safe and secure, and a world-class example of sustainable forest management and conservation".

The goal of the KPFMP is to achieve and sustain a conserved Karura Forest through stakeholder's participation for provision of ecosystem goods and services for the city residents and beyond.

The overall objective of the KPFMP is to have Karura Forest managed and sustainably conserved for provision of recreational and ecosystem goods and services to Nairobi residents and beyond.

The KPFMP will be the framework to moderate the participation of stakeholders, besides ensuring that the implementation leads to the sustainable management of the forest. To achieve these, the forest has been divided into four zones namely natural forest, wetlands, plantations and developed areas, each of which is put under a different management regime.

The threats and constraints to the conservation of the forest include:

- 1) Pressure from developers to claim land for building due to the prime location of Karura Forest.
- 2) Forest fires during dry periods.
- 3) Invasive plants like *Lantana camara* and other invasive weeds which grow vigorously, compromising the re-establishment and growth of indigenous plants and trees.

The specific management objectives that will guide the implementation of the KPFMP are:

- 1) To rehabilitate degraded parts of Karura Forest to a healthy, productive indigenous closed-canopy forest as well as ensuring the achievement of sustainable management in order to enhance forest habitat for indigenous wildlife species, conserve biodiversity, and protect water resources.
- 2) To keep the forest safe and secure for the enjoyment of all through the continual protection of the forest from any high impact development other than forestry activities and, ensuring ecotourism proposals are in the best interest of the forest.
- 3) To contribute to the improvement of the livelihood of local communities adjacent to the forest.
- 4) To make Karura an accessible conservation forest readily available to all for purposes of low-impact, sustainable eco-tourism.
- 5) To promote environmental education, and research in forestry.
- 6) To have in place the necessary infrastructure, vehicles machinery and equipment.
- 7) To provide optimum human resources for implementing the management plan.

The KPFMP further provides for monitoring and evaluation of the planned activities and its revision.

LIST OF ACRONYMS/ABBREVIATIONS

AFEW	African Fund for Endangered Wildlife
BIEA	British Institute in Eastern Africa
BP	British Petroleum
CBOs	Community Based Organizations
CFA	Community Forest Association
CID	Criminal Investigation Department
CSR	Corporate Social Responsibility
ESRI-EA	Environmental Systems Research Institute – East Africa
FCC	Forest Conservation Committee
FKFCFA	Friends of Karura Community Forest Association
FMA	Forest Management Agreement
ICIPE	International Centre of Insect Physiology and Ecology
ICRAF	International Centre for Research in Agroforestry/World Agroforestry Centre
IUCN	International Union for Conservation of Nature
JMC	Joint Management Committee
KEFRI	Kenya Forestry Research Institute
KFEET	Karura Forest Environmental Educational Trust
KFS	Kenya Forest Service
KPMG	Klynveld Peat Marwick Goerdeler
L.N.	Legal Notice
M&E	Monitoring and Evaluation
NBEs	Nature-Based Enterprises
NMK	National Museums of Kenya
Proc.	Proclamation
KPFMP	Karura Participatory Forest Management Plan
RA	Residents’ Association
SUB-COMP	Sub Compartment
TBP	Tropical Biodiversity Project
UN	United Nations
UNEP	United Nations Environment Programme
UNON	United Nations Office, Nairobi
UTM	Universal Transvers Mercator

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1. INTRODUCTION

This is the management plan for Karura Forest covering an area of 1,041.3 Ha. The forest comprises two blocks, namely Karura and Sigiria. The forest comprises of both natural forest and exotic plantations and is an urban recreational conservation forest in the capital city of Nairobi.

1.1. JUSTIFICATION

According to section 47 of the Forest Conservation and Management of Act 2016, all forests must be managed under a management plan. For the last 10 years, Karura Forest Reserve has been very successfully managed according to its first two participatory forest management plans. Previously the Forest Department, the predecessor of KFS, was responsible for all management actions and was not obliged to consult with other stakeholders. This was because there was no legal provision to allow for the active involvement and participation of stakeholders in forest management. It is during this period (in the 90s) that attempts were made to excise vast areas of the forest due to lack of stakeholder participation.

Karura Forest Reserve is a prime example of well-designed and successfully implemented participatory forest management plans. The first two participatory forest management plans have indicated that the management of the forest should be driven towards the achievement of a defined long-term vision for the forest, and the management decisions should not be made based on current considerations or influenced by factors other than the long-term sustainability of the resource. The current plan duration is from 2016 to 2020 and hence necessitates revision to also include the current aspirations of KFS, FKFCFA and other stakeholders as well take in consideration of contemporary issues.

1.2. APPROACH TO PLAN DEVELOPMENT

A consultation process was undertaken in the development of the third management plan, with key stakeholders contributing to its final form. The approach followed to develop this plan aimed at ensuring the sustainability of the forest by designing activities geared towards the achievement of defined objectives in the short-term and the planned future.

FKFCFA kicked off the consultative process with a retreat held in Naivasha from Feb 6 to 8 2019, the KPFMP being a major item on the agenda. All representatives of the community took part in this extensive discussion and had an opportunity to express their community's views and make their suggestions on all aspects of the plan.

Following this exercise, the Joint Management Committee (JMC) set up a drafting committee composed of two KFS and three FKFCFA staff. The drafting committee held five face-to-face meetings and had several dozen digital exchanges throughout the process. Consultations with the KFS management plans department were held on three occasions for guidance as the plan was being drafted. Progress was discussed and consultations held at 11 meetings of the JMC and 3 FKFCFA Board meetings (Table 1).

Table 1: Meetings of the JMC and the FKFCFA board where the KPFMP was discussed

JMC meetings			FKF Board meetings			
	Date	Meeting			Date	Meeting
1	17/01/2019	74th		1	18/09/2019	68th
2	13/02/2019	75th		2	19/11/2019	69th
3	26/03/2019	76th		3	22/01/2020	70th
4	16/04/2019	77th				
5	28/05/2019	78th				
6	21/06/2019	79th				
7	27/10/2019	80th				
8	10/09/2019	81th				
9	25/10/2019	82th				
10	26/11/2019	83th				
11	27/01/2020	84th				

A combined JMC and FKFCFA Board meeting was held on 5 February 2020.

A stakeholder meeting with the communities from Huruma, Githogoro and Deep Sea was held on 7 February 2020.

The full stakeholder meeting was held on 25 February 2020. The draft KPMFP was thoroughly reviewed, and all agreed amendments included in the final text (Appendix 1).

1.3. TITLE AND DURATION OF THE PLAN

The plan shall be referred to as ***Karura Forest Participatory Forest Management Plan (KPFMP)***. This plan covers five years starting from 26 April 2021 to 25 April 2026.

1.4. IMPLEMENTATION OF THE PLAN

The KPFMP shall be implemented by the KFS and FKFCFA guided by a Forest Management Agreement. All activities in the forest must be approved by the KFS & FKFCFA Joint Management Committee. Any development or project outside this plan must be approved by the Chief Conservator of Forests.

1.4.1. FUNDING FOR THE PLAN

The funding of the KPFMP will come from accrued revenue, KFS, FKFCFA, and development partner support.

1.4.2. AMENDMENTS AND REVISION OF THE PLAN

The monitoring and evaluation process which will be carried out throughout the plan. This will show whether amendments or revisions are needed as the plan is being implemented.

1.5. STATUS OF IMPLEMENTATION OF THE PREVIOUS PLAN

To date, a wide number of stakeholders have worked with KFS and FKFCFA in the forest. They have committed themselves to the goals and vision outlined in this third management plan. The achievements of the previous plan are as follows:

Natural forest management programme

- 143 ha of degraded plantation and indigenous sites in the forest have been cleared of invasive species and planted with suitable indigenous species.
- To supplement the Karura KFS nursery, a new nursery for indigenous trees and shrubs was established by the CFA to supply a wide variety of species sourced mostly from the forest to the regeneration program. All seedlings planted in the forest come from the nursery to ensure good quality and suitability.
- 49.6 ha of old eucalyptus stands have been felled and planted with indigenous species in the Northern part of the forest.
- New, innovative practices have been designed and used to get rid of eucalyptus stumps in cleared areas such as the monthly cutting back of young coppices.

Participatory forest management programme

- The Forest Management Agreement between KFS and FKFCFA was renewed.
- Cooperation between KFS and FKFCFA has been enhanced with the Forest Station Manager and his staff moving into Karura Forest House, the new office block shared by KFS and FKFCFA staff.
- The KFS & FKFCFA joint management committee meets every month to review activities, issues and take appropriate decisions including on financial matters.
- Relations with the FCC were strengthened with an official visit of the FCC to Karura on 23 February 2019.
- FKFCFA enjoys widespread support due to its good governance and has been able to mobilise funds to implement various projects in the forest.
- Due to this outstanding success, the partnership between KFS and FKFCFA as a model for other CFAs throughout the country who make knowledge visits.
- Workshops with other CFAs in the Conservancy were held including one as part of the FKFCFA 10th anniversary activities
- Nairobi CFAs have a representative on the FCC.

Forest safety and security programme

- 152 illegal title deeds have been recommended by the Land Commission to be revoked. Two Court cases are on-going involving others.
- There have been no serious security incidents in the forest since it has been open to the public. Sufficient funds were raised to fully secure the forest with a 15 km electric fence and patrols by 55 FKFCFA Scouts and 11 KFS Rangers.
- The fence is monitored and maintained daily, entry/exit points manned permanently by gate clerks, scouts, and Rangers.
- the risk of fire in the forest has been minimized through the systematic clearing of *Lantana camara* and Mauritius thorn. Lighting fires and smoking are strictly forbidden in the forest. Training of all staff in firefighting is carried out regularly.

Local communities' livelihood programme

- All surrounding communities both affluent and less affluent are represented on the FKFCFA board.
- The Joint KFS & FKFCFA committee where all decisions are made ensures all voices can be heard.
- The local communities have benefited considerably from the new management regime. The forest is no longer a place of danger for them but a source of many opportunities.

- The Joint Committee through FKFCFA employs 101 permanent staff, most of them from the surrounding informal settlements. All forestry contract work done in the forest is given out to women's and other groups from those villages. This amounted to KES 1,200,000 per month on average spent on contracts or casual labour.
- A bursary program has been set up by FKFCFA to support children of the community with secondary school fees. Over 100 candidates have benefited so far.

Environmental education, ecotourism and research programme

- The list of bird species has grown from 113 to 220 according to Nature Kenya which organizes regular bird-watching visits.
- Indigenous orchids which had disappeared from the forest through poaching and were reintroduced with help from the Kenya Orchids Society have been thriving and spreading in the forest.
- Nine motion-activated day and night cameras continue to reveal animal species never recorded before in the forest and shed knowledge on their abundance. These include striped jackal, palm civet and clawless otters.
- The abundance of wildlife, in general, has increased significantly in the absence of poaching. Animals have become much less shy of people and are easily seen adding value to visits to the forest. (See the list of medium to large mammal species in Appendix 2)
- The Colobus monkey project continues to be very successful as their population has reached 184 individuals from 142 introduced in 2014. The project has been showcased at international primatology meetings, increasing Karura's visibility globally.
- Two pairs of African crowned eagles have returned and have successfully nested and fledged chicks in the forest testifying to the recovering health of the ecosystem
- A study of the carbon-storing capacity of the forest has been carried out by an ICRAF sponsored student showed that the carbon-storing capacity of Karura averages at 37.62t/ha.
- A guidebook of Karura describing the history and biodiversity of the forest has been published by FKFCFA in 2019 entitled *Karura Forest – A Visitors' Guide*.
- Some Karura-based educational tools have been designed for school visits.
- Due to the vast improvement in security and infrastructure, the number of visitors to the forest has grown significantly over the last ten years and has reached an average of nearly 40,000 a month from practically none in 2009. Karura is now the No 3 attraction to visit in Nairobi according to Trip advisor and it has been awarded a "Certificate of Excellence" for five years running. The vast majority of visitors are Kenyans showing that there is real national ownership of Karura forest which has been dubbed "the people's forest". People come in large numbers to walk, jog, cycle or just enjoy being in a natural setting.
- Karura now has five picnic sites, Amani, KFEET, Ruaka, Sigiria and Karura Gardens (Figure 4).
- Forest rules have been developed and clearly displayed at all entry points to regulate visitors' behaviour in the forest.
- An attractive website has been designed and is regularly updated and populated with interesting articles. The Facebook page Friends of Karura Forest is also very active and has attracted so far over 23,000 page-likes.

- The Joint Committee and Karura Forest Environmental Education Trust (KFEET) have jointly employed an education officer who takes school parties and special interest groups on educational tours of the forest. Thousands of school children visit the forest every year and get a chance to learn about forests and the environment thanks to a teaching program targeting different age groups.
- FKFCFA has set up a sponsored visit project for underprivileged schools and orphanages, providing them with transport and lunch so that their pupils have a chance to visit the forest.
- A 1.6 km circuit for physically challenged visitors, the Matembezi Trail, has been built in Sigiria.

Infrastructure and equipment

- A 700m², state of the art office block has been built to house KFS Karura station and FKFCFA staff
- Over 50 km of track and trails are being maintained.
- Nine bridges have been built and five culverts installed and maintained.
- Signage is being renewed and maintained throughout the whole network of tracks including 5 circuits of different lengths.
- The map of the forest has been updated four times to guide visitors.
- Monkey-proof litter bins and 150 benches have been put at various places along the tracks.
- 70 picnic tables at the various picnic areas installed and maintained.
- Entry gates, washroom and storage facilities have been improved at Gate-A on Limuru road, Gate-C on Kiambu Road, and Gate-F on Thigiri Lane.
- Bio-digesters recycling plants have been installed at the office block/Karura Forest House, Limuru Road Gate-A, Amani picnic site, Gate-F, and KFEET.

Table 2: Status of the implementation of the previous plan

No.	Management programme	Activities	Plan target	Key Achievements	(%) Implementation	Challenges during implementation/	remarks
1	Rehabilitation and management programme	Revert ageing plantation into natural forest	15 ha per year	143 ha regenerated Nursery created producing sufficient seedlings	190%	Invasive species, logging ban	availability of seedlings of suitable species
2	Participatory forest management programme	Joint implementation of KPFMP and management of the forest	Regular meetings and consultations	Monthly meetings of JMC 7 fields visits and workshops held with other CFA's	100%	Other CFA's stages of development	
3	Forest safety and security programme	Secure the forest land	Keep the forest secure Acquire title deed for the forest	Security incidents extremely rare 152 illegal title deeds revoked Success in 1 land grabbing court case	90%	Slowness of procedure to acquire a title deed for the forest	
4	Local communities livelihoods programme	Contribute to the needs of the community	Create jobs and IGA's	85 permanent jobs created 1,000 man/day per month worth of contract work	100%	Need for full transparency in awarding contracts	

No.	Management programme	Activities	Plan target	Key Achievements	(%) Implementation	Challenges during implementation/	remarks
5	Environmental education, ecotourism and research programme	To promote environmental education, ecotourism and research in forestry	Improve education and research activities	15,000 school children visit the forest every year Guidebook published	90%	Need for more educational material specific to Karura	
6	Infrastructure, vehicles, machinery and equipment	To ensure appropriate infrastructure and equipment are in place	Infrastructure and equipment available	Office block built, two 4x4 pickups and 5 motorcycles available	90%	Some activities dropped as not suitable such as 'colobridges'	
7	Human resources	To provide adequate human resources	Have adequate staffing	Office and field fully staffed	100%	High rotation of rangers	

1.6. LESSONS LEARNED

1.6.1. Forest regeneration

Planting should exclusively take place during the long and short rainy seasons.

A wide variety of suitable indigenous species needs to be available in sufficient numbers at the FKFCFA nursery.

1.6.2. Local communities

The awarding of contract work should be done in a fully transparent manner to ensure the relationship with the community remains good.

Social projects benefiting the community such as the FKFCFA bursary fund should be continued as they ensure ownership of the forest by the community.

2. DESCRIPTION OF KARURA FOREST RESERVE

2.1. GEOGRAPHICAL LOCATION

Karura Forest Reserve is situated in the northern part of Nairobi Municipality. Its boundaries fall within a rectangle having a northwest corner at UTM 37M 254354m E 9864755m S and a southeast corner at 262196m E 9861072m S. It forms part of the Nairobi River basin. See Figure 1.

The Forest comprises three sections separated by the Limuru and Kiambu Roads.

The western section (known as Sigiria) is delineated by a cut and beacons line along its boundary with the residential area of New Muthaiga to the west, the residential areas of Gigiri/Rosslyn to the north (along the Thigiri River, a tributary of the Getathuru River), Limuru Road to the east and the Getathuru River to the south.

The middle section is bound by a cut and beacons line along Limuru Road, the residential area of Muthaiga North and Runda to the west, Rui-Ruaka River, Huruma village, a road, and residential estates to the north, Kiambu Road to the east, and Getathuru River to the south.

The eastern section (Mazingira) is bound by the Kiambu Road to its west, Thika Road to the east, and Muthaiga Golf Club to the south (to which it yields an extension).

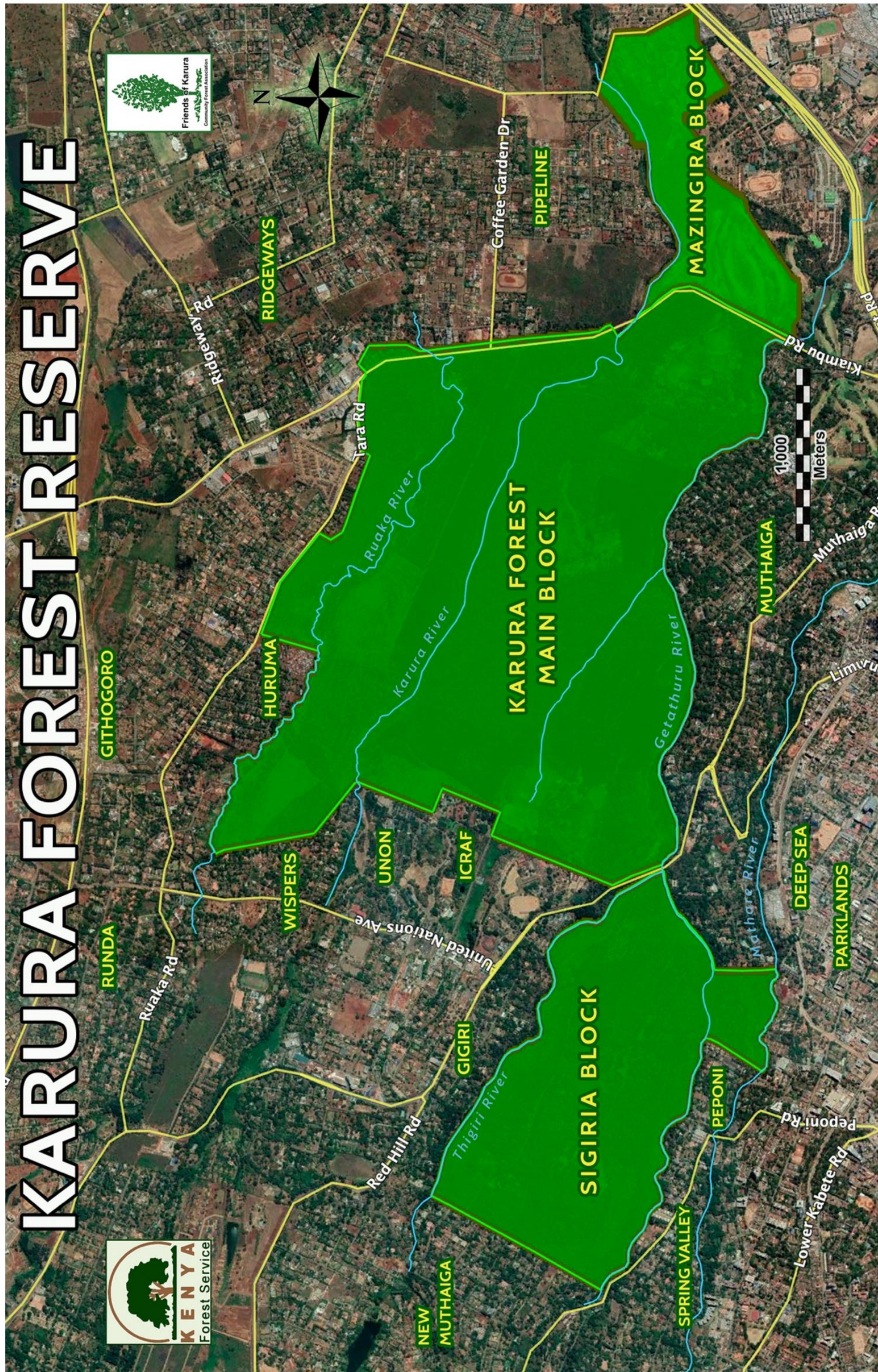


Figure 1: Karura Forest geographical location map

2.2. LEGAL AND ADMINISTRATIVE STATUS

Karura Forest Reserve was gazetted in 1932 through Proclamation No. 44. The Forest became a Central Government Forest Reserve in 1964, through Legal Notice 174. Since its establishment in 1932, the forest has been affected by 5 excisions totalling approx. 114Ha as shown in Table 2.

Table 3: History of alteration of boundaries of Karura Forest Reserve

Year	Proclamation / Legal Notice	Action	Area affected	Total area (ha)
1932	Proc. 44/1932	Establishment of Karura Forest Reserve	1062.7 Ha	1062.7 Ha
1951	Proc. 15/1951	Excision	- 1.6 Ha	1061.1 Ha
1954	Proc. 30/1954	Addition	+1.6 Ha	1062.7 Ha
1956	L.N. 289/1956	Excision	-18.6 Ha	1044.1 Ha
1964	L.N. 174/1964	Declaration as central forest		1044.1 Ha
1986	L.N. 310/5.12.1986	Excision	- 2.78 Ha	1041.3 Ha
1993	L.N. 301/24.9.1993	Excision.>Exchange Addition>	- 5.86 Ha + 5.63 Ha	1041.3 Ha

(Source - KFS Survey Unit)

Over the years, gazetted forestland in Karura has been allocated or leased to national and international public institutions.

Administrative status

The forest is divided into two blocks comprised of five beats jointly managed by KFS and FKFCFA under the Joint Management Committee (JMC). There used to be three outposts. Only one remains at Limuru Gate-A while the other two were abandoned. These are the one in Sigiria due to old age and the other next to BP Shell Club due to insecurity (Table 4).

The forest reserve has a Forest Station Manager under the Ecosystem Conservator Nairobi, within Nairobi Conservancy. The Forest Station Manager and the FKFCFA Operations Manager oversee daily activities of their respective staffs under the guidance of the JMC.

Table 4: Distribution and status of of Karura Forest areas

Block	Area (Ha)	Remarks	Outposts and status
Karura & Eastern Salient (Mazingira)	797.3	This is the largest block and houses the KFS Headquarters	No longer exist except at Limuru gate
Sigiria	244.0	Features a large marshland. Well protected by the adjacent residential areas.	No longer exist
Total	1,041.3		

2.3. Biophysical Description

2.3.1. Topography

The topography of Karura is gently rolling, occasioned by shallow valleys. Drainage is generally in the southerly and eastern direction. Susceptible depressions in the Western Section of Karura called Sigiria forest hold small local swamps which are threatened by eucalyptus trees. The highest point is in the northwest at 1,710m at Sigiria gate and the lowest in the southwest at 1,640m at Old Kiambu gate.

2.3.2. Climate

The climate of Karura Forest is driven by the East African bi-modal rainfall regime, characterized by two rainy seasons: March to May and October to December. The months of July and August are cold, cloudy, and dry; September to October is a temperate and dry period. January and February are typically hot and relatively dry months.

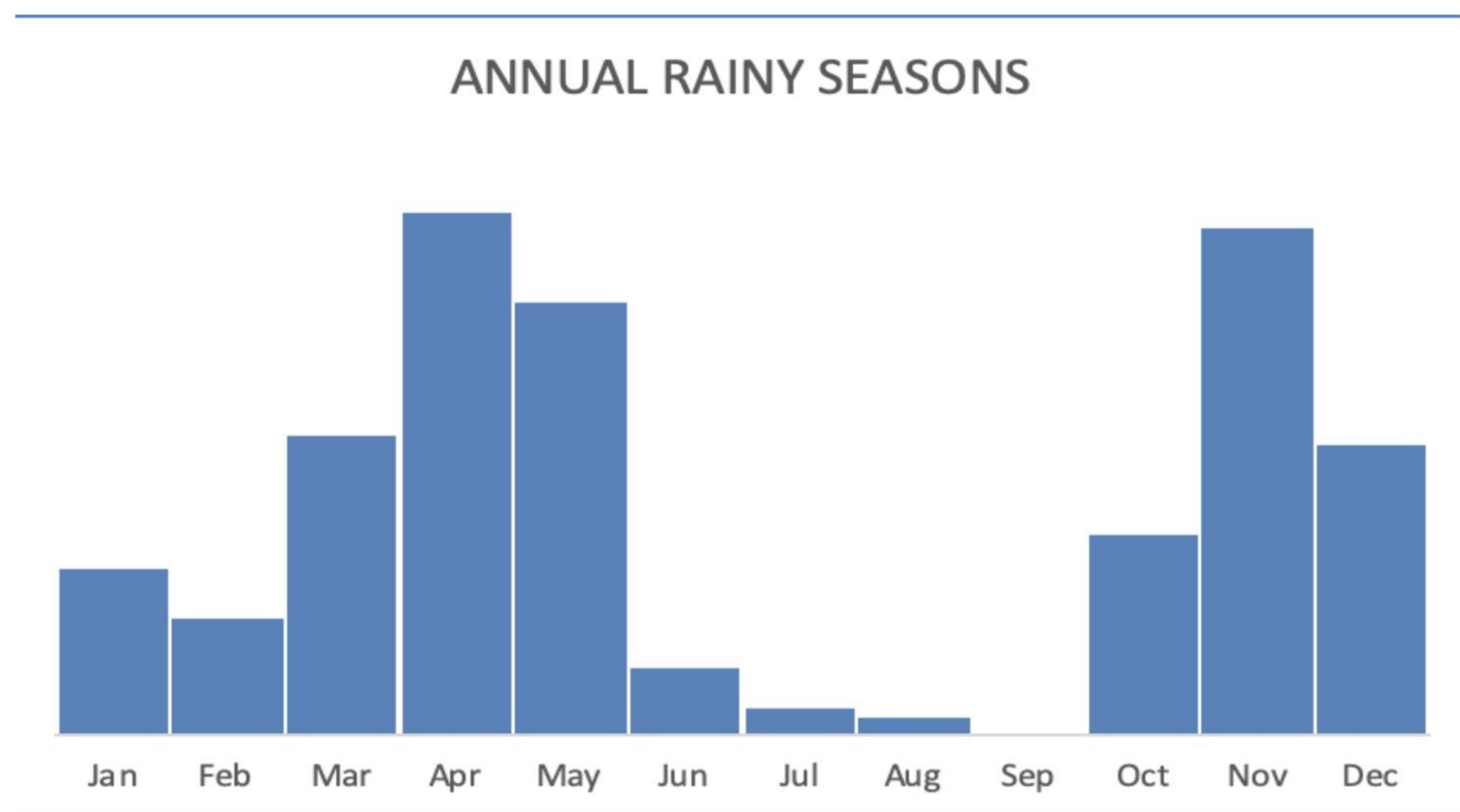


Figure 2. Karura Forest Reserve rainy periods expressed as the number of months with rainfall greater than the 75-year average monthly rainfall

The average annual rainfall at Karura Forest was recorded over the past two decades as 1,012 mm with a maximum of 1,770 mm and a minimum of 576 mm (Fig. 2). Long-term rainfall record analysis indicates a significant trend of increasing rainfall over the past 75 years, from an annual average of ca. 800 mm over the five decades from 1945 to just over 1,000mm for the last two decades.

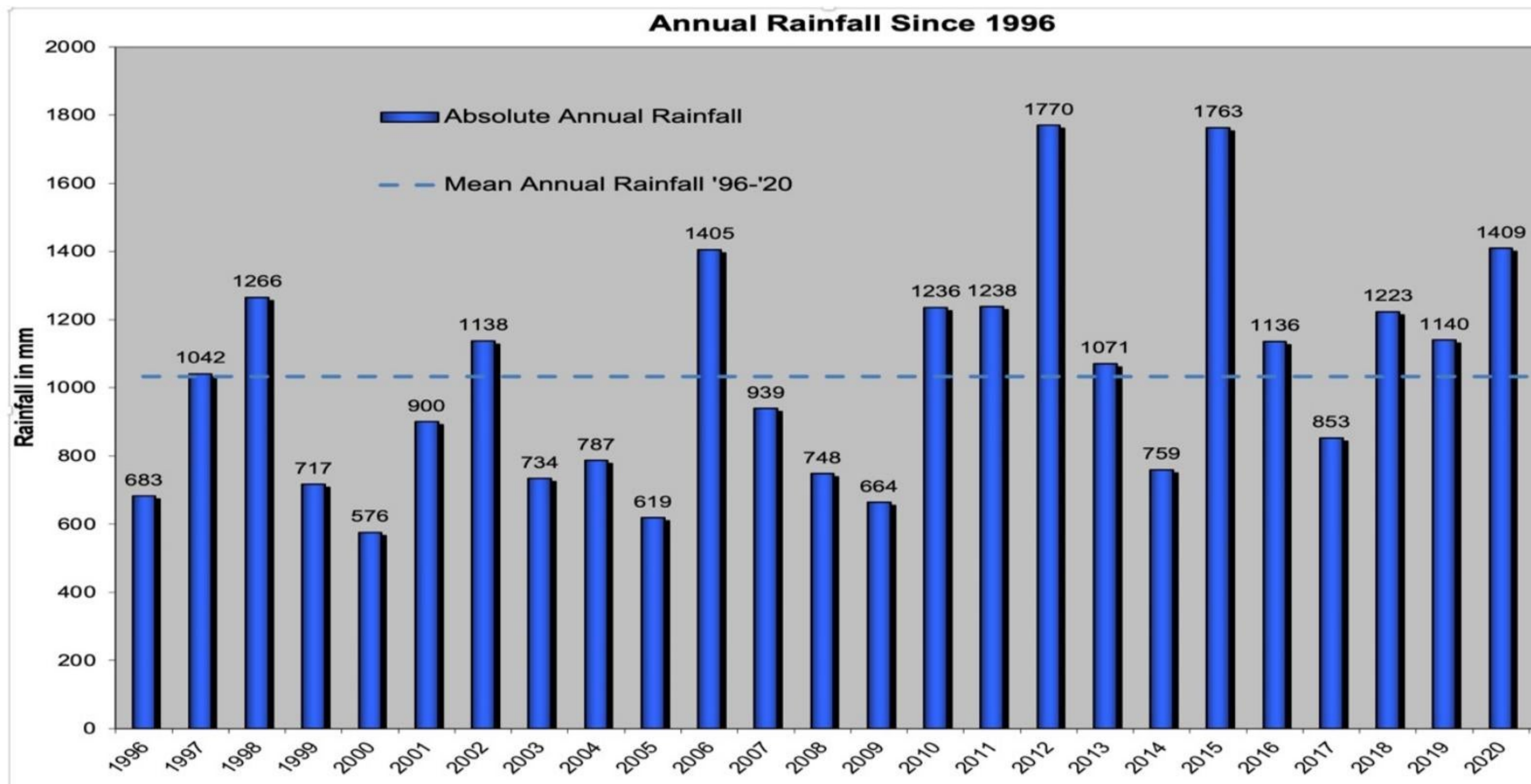


Figure 3: Annual rainfall totals in Karura Forest from 1996 to 2019.

Temperatures remain relatively equitable varying diurnally and with the rainy seasons between 14^o and 27^o C in the hot, dry seasons, and between 8^o and 22^o.C in the cool, rainy seasons. The forest is noticeably cooler than surrounding areas throughout the year.

2.3.3. Geology

The Karura Forest lies over tertiary volcanic rocks. Volcanic tuffs with intercalated flows of basaltic lava are the common forms. Both types are occasionally exposed in the deeper river valleys, and the tuffs yield the common grey building stone of the Nairobi district. Occasionally "Chimneys" of lava are found exposed on the tops and rides of ridges as in both the Western section and Middle section of Karura.

2.3.4. Soils

The area has suffered very little tectonic or other disturbances since tertiary times, and thus the parent rocks have been weathered to great depths and giving very even soil profiles. Under natural forest the resulting soil is very deep, riddling brown clayey loam with slow but free profile drainage. Such forest floor soils become very sticky when wet but dry very quickly and tend to shrink and crack. The upper few inches of soil are usually stained dark brown with incorporated humus, but no deep litter layer develops.

Under grassland in freely drained areas, the soil is very similar to that under forest stands, but in the low-lying areas, a different soil is found. These low-lying areas are intermittently waterlogged, and the water table fluctuates greatly, and a small amount of fine soil material is usually carried in from neighbouring higher ground. Under such conditions, the soil is usually very heavy, dark grey clay, often stained black with un-decomposed humus, so-called "black cotton soils". At varying depths below this clay layer, from 2" to 3ft. below the surface,

red-brown laterite is found. It is a re-cementation product, rich in iron compounds, associated with swampy areas having a shifting water table.

Laterite, locally known as 'murram' is useful gravel for road maintenance. Another form of 'murram' is partially decomposed parent rock and may be found at the foot of nearly all soil profiles where the rock is sufficiently near the surface for it to be excavated. This form of 'murram' is also popular for road surfacing but is less satisfactory than laterite. Generally, Karura Forest soils are eminently suited to tree growth, with assisted drainage in the case of swampy sites.

2.3.5. Hydrology and Drainage

Water resource availability

Karura Forest is well-positioned for water availability as it has five rivers which flow throughout the year (not seasonally). During the rainy season, flooding happens occasionally in low lying areas. Regrettably, these rivers are heavily polluted.

Five tributaries of Nairobi River pass through Karura Forest Reserve (see Fig. 1). These are:

- The Ruaka River which separates Karura River and the Runda Residential area.
- The Karura River which traverses through the forest.
- The Getathuru River which borders the Forest along its Southern edge with Muthaiga Residential area.
- The Thigiri River (a tributary of Getathuru River) which borders the Eastern section of Karura Forest.
- The Mathare River which borders the forest on the Eastern side of Sigiria.
- Karura also has one permanent pond, two permanent wetland areas and six seasonal ones.
- There are five waterfalls in the forest, of which two are accessible to visitors

The Nairobi City Council also supplies water, for which a monthly charge is paid. The rehabilitated old borehole at Amani Gardens also provides water which irrigates the picnic grounds during the dry season.

Preliminary analyses have shown that the rivers are highly polluted with coliform bacteria, presumably from poor sewage treatment in the surrounding neighbourhoods: titers from sample points as the streams enter the forest were >2,500 cfu. There is some evidence that the streams enjoy some reduction of the bacterial load as they pass through the forest, but the journey is not long enough to result in a significant reduction.

Water utilization and demand

The main KFS indigenous tree nursery uses water from the Karura River and the Nairobi City Council. The small KFS tree nursery uses water from the Nairobi City Council. The tree biotechnology nursery has its own borehole to ensure a pure water source. The FKFCFA nursery uses water from the Amani borehole. The policy for tree planting is now to always plant during the rainy season.

Groundwater is recharged naturally by rain and by rivers. Recharge may be impeded somewhat by human activities including paving, development, or logging. These activities can result in loss of topsoil resulting in reduced water infiltration, enhanced surface runoff and reduction in recharge. Use of groundwater, especially for irrigation, may also lower the water

table. Groundwater recharge is an important process for sustainable groundwater management since the volume-rate abstracted in the long term should be less than or equal to the volume-rate that is recharged.

Therefore, enrichment planting with bamboo and other species is necessary. Wetlands must also be conserved for biodiversity.



Plate 1: The Karura River above the main waterfall

2.4. BIODIVERSITY DESCRIPTION

2.4.1. Flora

Forest plantations remaining after the past ten years' clearing and replanting currently cover 353.5 ha and comprise species such as *Araucaria cunninghamii*, *Eucalyptus saligna*, *Eucalyptus globulus*, *Cupressus torulosa* and *Cupressus lusitanica*.

Almost all the plantations in the forest have passed their economic rotation age and are therefore succumbing to age-related mortality. The *Eucalyptus* spp. range from 38-93 years, *Araucaria cunninghamii* (44-56 years), *Cupressus torulosa* (34-56 years).

Indigenous forest covers 383 Ha (of which 212 is original upland sclerophyllous forest and the rest are areas restocked or replanted with indigenous (after clearing of plantations and invasive shrubs) and are comprised of species such as *Olea europaea* var. *africana*, *Croton megalocarpus*, *Warburgia ugandensis* (Muthiga), *Brachyleana huillensis* (Muhugu), *Uvaridendron anisatum*, *Markhamia lutea*, *Teclea nobilis*, *Juniperus procera* (Cedar), *Craebean brownii*, *Newtonia buchananii*, *Salvadora persica*, *Ficus thonningii*, *Trichilia emetica*, *Calondendrum capense* and *Dombeya goetzenii*. Appendix 3 shows a list of Karura's most prominent indigenous species, some of which are endemic or rare.

The area of the forest is further subdivided as shown in Table 6. The "Other" category also covers all the area occupied by buildings, tree nurseries and other facilities.

Table 5: Karura Forest Area Statement as of 2021 based on various survey and mapping exercises, and registering of clearing and planting exercises over the past ten years (in hectares).

Forest Block	Indigenous	Cleared Plantation Restored with Indigenous	Plantation Restored with Indigenous	Degraded Indigenous Restored	Exotic Plantation Remaining	Grassland Wetland	Other	Total
Karura	253.5	52.0	62.9	91.1	182.0	11.5	55.0 ¹	708.0
Mazingira	25	0.0	0.0	0.0	0.0	0.0	53.5 ²	78.5
Sigiria	17.1	10.9	45.9	2.1	170.5	7.0	1.3	254.8
Total	295.6	62.9	108.8	93.2	352.5	18.5	109.8	1041.3
Percent	28%	6%	10%	9%	34%	2%	11%	100%

¹Includes the KFS HQ enclave, the Tree Biotechnology Project, the KFS nursery.

² Includes allocated and leased areas, e.g., Muthaiga Golf Club, DCID headquarters, NSIS.

- The main Karura block and the Mazingira (Eastern Salient) block sum to 786.5 ha. Reported areas are not cadastral but indicative from various sources such as old paper maps, ground surveys with GPS instruments and delineations on Google Earth satellite coverages.
- *Indigenous Forest* comprises the original forest components such as the pristine Karura River valley and central portions of the forest that were logged over for large trees in the early 20th century
- *Cleared Plantation Restored with Indigenous* comprises areas cleared of *Lantana camara* shrubs and exotic plantation trees and replanted with indigenous species by FKFCFA and KFS.
- *Plantation Restored with Indigenous* broadly describes areas that have been cleared of *Lantana camara* shrubs allowing existing indigenous wildlings to survive, assisted with enrichment re-planting. A number of exotic emergent trees remain.
- *Degraded Indigenous Restored* refers to areas of Degraded Indigenous that have been cleared of *Lantana camara* and Mauritius Thorn shrubs and the remaining indigenous trees and shrubs allowed to thrive, in some cases with enrichment planting.
- *Exotic Plantation Remaining* comprises areas of Eucalyptus, Araucaria and Cypress stands that were planted on clear-felled areas between 1912 and 1990 and that have not yet been cleared and replanted with indigenous species.

Additionally, there are many shrubs which have wide local medicinal uses *Strychnos henningsii* (Muteta), *Erythrococca bongensis* (Muharangware), *Vangueria madagascariensis* (Mubiro), *Rhamnusprinoidea* (Mukarakinga), *Caesalpinia volkensii* (Mubuthi), *Solanum* spp. (Mutongu), *Eleodendron burchanani* (Mutanga) and *Rhus natalensis* (Muthigio).

The riparian belts along rivers Getathuro and Ruaka are partly covered by *Arudinaria alpina*, the Kenya native bamboo species. The exotic giant bamboo *Dendrocalamus giganteus* is mainly found growing within the area of the tree nursery along Karura River where it was introduced in the past. Additionally, there are three wetlands which occupy 10.5Ha. These serve as important habitats for birds and therefore are ideal areas for bird watchers.

2.4.2. Fauna

The motion-activated camera traps have shown that the forest hosts around 22 different varieties of mammals . These include Harvey's duikers, suni, bushbucks, bushpigs, genets, civets, bushbabies, porcupines, sykes monkeys, squirrels, hares, epauletted-bat, giant pouched rats, white-tailed mongoose, clawless otters, side-striped jackals (see Appendix 2). *Colobus guereza kikuyense* (Colobus monkey) have been translocated to the forest from rapidly disappearing habitats in the Mount Kipipiri area.

Reptiles include rock pythons, and various other snake and lizard species.

2.4.3. Avifauna

Some 220 bird species have been observed in Karura Forest. They include African crowned eagle, Ayres Hawk-eagle, crows, owls, sparrows, doves, weavers, Hartlaub's Turaco and Narina Trogon.

2.5. OTHER RESOURCES

2.5.1. Non-wood resources

Karura being a recreational conservation forest, only non-consumptive activities are permitted.

There is limited honey production by the surrounding community.

Seeds and wildlings are collected in the forest by the KFS and the FKFCFA nursery sustainably.

2.5.2. Ecotourism

The forest features a 15-metre waterfall, caves that are considered sacred by many and have historic value because of their use during the days of the Mau Mau. An archaeological survey of the caves carried out by NMK has revealed stone tools and other artefacts dated 4 500 years old and others estimated at between 50 and 300 000 years old, the middle stone age period. There are also marshlands which attract birdlife, a wide diversity of indigenous trees, Lilly Lake, Amani Garden, beautiful nature trails and Wangari Maathai corner. This is the place where Professor Wangari Maathai (Nobel Peace Prize winner) was attacked for standing up to the developers hoping to grab the area of land to the north of the Karura River. See Fig. 4, following page. Other ecotourism amenities include four picnic sites and two eateries (Table 7).

Table 6: Ecotourism sites in Karura Forest

ECOTOURISM	MAIN BLOCK	SIGIRIA
Walking, jogging	35 km of trails	15 km of trails
Bike rental	2 sites	1 site
Horseback riding	Not permitted	Permitted
Dogs off-leash areas	2 sites	1 site
Picnic sites	3 sites	1 site
Scenic areas	6	2
Sports facilities	2	1
Restaurant	1	1

KARURA FOREST ECO-TOURISM HIGHLIGHTS

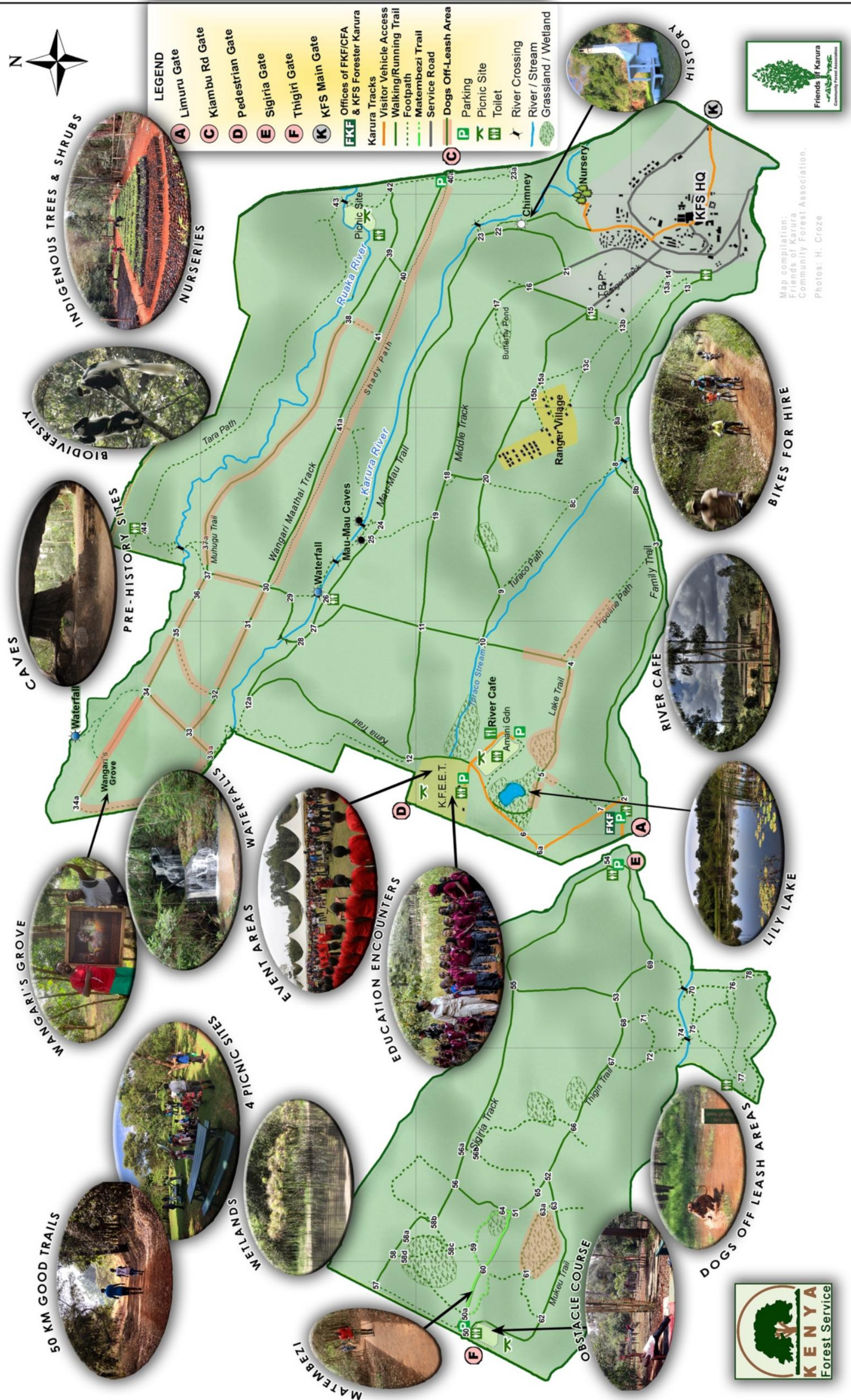


Figure 4: Eco-Tourism sites in Karura Forest.

2.5.3. Infrastructure and Equipment

Supporting infrastructure is spread out throughout the forest such as washroom facilities and bridges. There are 4 gates with gate house, water, electricity and internet open to the public and two service gates. There is a state-of-the-art office block at Limuru gate housing KFS Karura station and FKFCFA staff.

Table 7: Infrastructure in Karura forest

INFRASTRUCTURE	MAIN BLOCK	SIGIRIA
Public gates	3	2
Service gates	2	1
Washrooms and long drops	3 + 6	1 + 2
Benches	130	30
Picnic Tables	50	10
Office block	1	0

The station manager has a double-cab 4x4 pick up, two motorbikes and a tractor, trailer and bowser. FKFCFA fields a 4x4 pickup and seven motorcycles to be used in the forest.

2.5.4. Human resources

At present 30 people are employed by KFS at the forest station, namely: One Forest Station Manager, one Assistant Station Manager, 11 Rangers, and 15 casuals.

Table 8: KFS staff component in Karura forest

Staff Cadre	Current strength
Forest Station Manager	1
Assistant Forest Station Manager	1
Admin Assistant	1
Forest Guards/Rangers	12
Casuals	15
Total	30

The Joint Management Committee through FKFCFA employs 101 persons as scouts, clerks, tree-carers, administrative staff, and many casual workers for clearing and planting in the forest.

Table 9: JMC through FKFCFA staff component in Karura Forest

Staff Cadre	Current	Staff Cadre	Current
FKFCFA Ops. Manager	1	Education Officer	1
Forest Scouts	55	Events Coordinator	1
Gate Clerks	12	Restoration Officer	1
Tree-carers/Caretakers	21	Research & Communication	1
Accountant	1	Admin Assistant	2
Assistant Accountant	1	IT Officer	1
Infrastructure Coordinator	1	Colobus Research Officer	1
Gate Clerks Supervisor	1		
Totals	93		8

2.6. HISTORY OF KARURA FOREST RESERVE

2.6.1. Pre-gazettement

During the pre-colonial period, Karura Forest is believed to have been “claimed” by various Gikuyu families. The forest was surrendered to the British Government at the time of colonization allegedly on condition that it remained forest land.

2.6.2. Post-gazettement

Karura Forest was gazetted in 1932 and was one of the earliest forests in Kenya to be recognised as a Reserve.

The first experimental plantations in Karura were made in 1906. At that time various species of Eucalyptus and some Cypress were tried. In the initial stages, the Forest was comprised principally of a natural forest of *Brachylaena huillensis* (Muhugu), *Croton megalocarpus* and *Warburgia ugandensis* (Muthiga). Up to 1935, it was fashionable to plant a certain proportion of indigenous species, either pure or in mixture with Eucalyptus. However, when Eucalyptus was found to grow extremely fast, the natural forest was reduced over the years and re-planted with this species. Eucalyptus provided fuel wood at a rotation age of twelve (12) years whilst it was estimated that the natural forest would require seventy years to reach an equivalent girth and volume. This wood was used to provide fuel wood for the railways, poles to carry electrical wires, and for the construction industry.

With time and based on the ever-pressing demands for fuel from the adjacent and fast-growing metropolis of Nairobi, Eucalyptus became the principal species planted almost to the exclusion of all others. Another species *Araucaria cunninghamii* was established, made good progress and proved a possible alternative to Eucalyptus for planting in Karura, but its fuel-wood rotation of fifty (50) years was too long in comparison.

Demand for fuel and construction material in Nairobi from 1950 - 1970 increased with a growing African and Asian population despite the existence of other forms of fuel such as electricity and paraffin.

The plantations in Karura were established through the 'shamba' (farm) or Taungya system. Kenya's *shamba* system has been generally defined as a form of forestry, where farmers are encouraged to cultivate primary crops (maize, cabbages, potatoes, beans, and carrots) on previously clear-cut public forest land on the condition that they replant trees. Since the mid-20th century, Kenya adopted this system to establish tree plantations using cheap or free labour, to meet the demand for timber and wood products.

2.7. CFA FORMATION PROCESS AND STATUS

Friends of Karura Community Forest Association (FKFCFA) was registered in October 2009 and designated by KFS as the CFA for Karura Forest Reserve. Its categories of members consist of individual, families, corporates, and people bordering the forest who have a registered neighbourhood association. Such associations are invited to designate a representative member who may take a seat on the FKFCFA board.

FKFCFA has a constitution that specifies how the association is to be run and is registered by the Registrar of Societies under Cap 108. FKFCFA has a board of 18 members composed of the Chairperson, two vice-Chairpersons, Secretary, Treasurer, Assistant Treasurer and three committee members elected at the AGM (Table 10). The others are ex-officio representatives chosen by each neighbourhood association. Mji ya Huruma has two representatives on the board on account of being a major stakeholder.

Table 10: Seats occupied on FKFCFA Board and the Joint Management Committee

FKFCFA had 1,400 members as of the end of 2020. However, through the membership of neighbourhood associations, FKFCFA represents many thousands of forest stakeholders.

The CFA has a Forest Management Agreement with KFS under which the Forest Reserve is jointly managed. All decisions taken by the Joint Management Committee concerning the Forest Reserve must be in line with the KPFMP and are taken jointly by both parties. Both parties must sign off on any disbursement from the joint account which receives all income accrued from entrance fees and events.

FKFCFA BOARD	
Chairperson	1
Vice-chairperson	2
Secretary	1
Treasurer	1
Assistant treasurer	1
Elected members	3
Neighbourhood association	9
JOINT MANAGEMENT COMMITTEE	
KFS	4
FKFCFA	4

3. SOCIO-ECONOMIC SITUATION

3.1. SOCIO-ECONOMICS

Karura Forest is surrounded by communities of very different socio-economic status, with differing users' rights and opportunities (see Fig. 1).

The communities include:

- Muthaiga residential area
- New Muthaiga residential area
- Gigiri residential area
- Ridgeways residential area
- Deep Sea informal settlement in the Westlands area
- Huruma and Githogoro informal settlements, to the North of the forest.
- Runda residential area
- Wispers residential area
- Peponi residential area
- Spring Valley residential area

Huruma and Githogoro informal settlement have ten registered groups which benefit from the Karura Forest through their involvement in forest rehabilitation. Members of this settlement have also been allowed to keep beehives in the forest.

All the above community groups are represented on the FKFCFA board.

Karura over the years has become very popular with the public as a recreational venue, especially those living near the forest. The number of visits has grown from zero in 2009 to an average of nearly 40,000 a month in 2020 (see Fig. 5). WTP has not been a problem as visitors have seen many improvements over the years including security being maintained at a very high level. However, entrance fees have been kept unchanged during the decade to ensure affordability for the majority. The increase in the cost of living has been offset by the increase in the number of visitors and parking fees introduced in 2017 which only affect the higher income visitors.

Visitors come to the forest mainly for health and relaxation. They walk, run, ride bikes, or just enjoy the fresh air. According to reactions on social media (the FKFCFA Facebook page has >25,000 followers), the forest main attraction is that it is a natural, safe, clean, and serene environment in which to exercise. Visitors find the forest has a calming and relaxing effect and help improve health and wellbeing. Therefore, the policy as embedded in this plan is to keep the forest as natural as possible with only very low footprint activities allowed.

Informal settlement dwellers mostly do casual work in the forest and elsewhere, some are small scale traders, artisans, *bodaboda* (motorbike taxi) operators or small-scale livestock keepers. Karura is a major employer for those communities and has contributed significantly to livelihood improvement by offering on average 15,000 person days of casual work per year.



Figure 5. Entries to Karura Forest Reserve between 2010 and 2020

Firewood collection is allowed under supervision once a week in non-indigenous plantation areas. On average between 30 and 50 women collect one head load per visit.

3.2. STAKEHOLDER ANALYSIS

There are various stakeholders with an interest in the forest. Their impact on forest management and conservation has been significant thanks to the efforts made to involve them in participatory forest management activities.

3.2.1. Range of Stakeholders

Karura Forest Reserve stakeholders are numerous and broad range. They include:

- Kenya Forest Service.
- Private and business Sector.
- Communities and residents Associations.
- Donors – donations have been received from a wide range of organizations and individuals with an independent interest in preserving the forest.
- Non-governmental organizations.

The integration of stakeholders promotes:

- A sense of ownership of the forest.
- Sustainable and long-term management of the forest.
- Strengthening social security, protection of traditional user rights and access to forest resources.
- Communal risk adjustment strategies.
- Complementary rather than competitive activities in forest management.

3.2.2. Roles and Responsibilities of Stakeholders

Since 2010, Karura Forest Reserve has been co-managed by KFS and the Friends of Karura Community Forest Association (FKFCFA) by a Joint Management Committee under the aegis of the FMA. The FKFCFA has been registered since 2009 in line with provisions of the Forests Act 2005 and the Societies Act. FKFCFA provides a platform that facilitates collaboration with key stakeholders. It has a joint management agreement with the KFS to manage the Karura Forest sustainably for the benefit of local and wider communities and ensure that Karura Forest is protected for future generations. Currently, it includes representation from all surrounding communities (both more and less affluent). During the five years of this third management plan, KFS and FKFCFA aim to encourage current stakeholders to be involved further in the execution of the management plan and to seek additional stakeholders.

The only stakeholders negatively affected by the new participatory management mode of the forest have been those holding or claiming fraudulent land titles for land in the forest. The fight in the courts against illegal land-grabbing has been relentless and largely successful. However, vigilance remains the order of the day. The community who could access the forest and its resources freely before the forest was fenced realized very early on the accrued benefits in terms of enhanced security and most importantly massive job creation among other social benefits in their favour due to the new paradigm for the forest.

Table 11: Stakeholders' roles and responsibilities

STAKEHOLDER	ROLES AND RESPONSIBILITIES	LEVEL OF INFLUENCE
GOVERNMENT MINISTRIES, DEPARTMENTS AND AGENCIES		
Ministry of Environment and Forestry	<ul style="list-style-type: none"> Enacting policies and programmes aimed at improving, maintaining, protecting, conserving and managing the richness of Kenya's natural resources including water, forestry, wildlife and environment. In addition, it will be tasked with the responsibility of ensuring that Kenyans have good access to clean, safe, adequate and reliable water supply. 	High
Kenya Forest Service	<ul style="list-style-type: none"> Forest administration Tree planting Protection of the forest Revenue collection from forest based industries in Karura forest Tree planting Enforces forest laws and regulations Licensing and regulation of exploitation of forest products Clear felled areas re-forestation and rehabilitation of degraded areas Maintenance of plantation forests Collaboration with stakeholders on ecosystem management Forest fires prevention and suppression 	High
National Land Commission	<ul style="list-style-type: none"> To manage public land on behalf of the national and county governments; To recommend a national land policy to the national government; To advise the national government on a comprehensive programme for the registration of title in land throughout Kenya; To conduct research related to land and the use of natural resources, and make recommendations to appropriate authorities; To initiate investigations, on its own initiative or on a complaint, into present or historical land injustices, and recommend appropriate redress; To encourage the application of traditional dispute resolution mechanisms in land conflicts; To assess tax on land and premiums on immovable property in any area designated by law; and To monitor and have oversight responsibilities over land use planning throughout the country. 	High
Survey of Kenya	<ul style="list-style-type: none"> Establishing and maintaining a national geodetic control network that covers the whole country to facilitate other surveys and research. To produce and maintain plans of property boundaries in support of land registration and to ensure guarantee and security of land tenure. To produce and continuously update national topographical basic maps for the whole country at various scales for development planning and for production of other maps. Other functions are; To inspect and maintain national and international boundaries. To prepare and publish the National Atlas of Kenya, as a documentation of National Heritage and promotion of Nation's identity. 	Medium

Ministry of Lands and Physical Planning	<ul style="list-style-type: none"> • Administration and Support Services. Overall policy direction and co-ordination of the Ministry's functions • Physical Planning. Provision of advisory and National Physical Planning services, general principles on land planning and coordination of planning by counties in terms of policies, standards and guidelines and technical assistance and capacity building for counties on Physical Planning matters • Land Adjudication and Settlement. Ascertainment of land rights and interests, land consolidation and adjudication, Acquisition of agriculturally viable land for settlement of poor landless Kenyans, management of the Agricultural Settlement Fund, management of Group Ranches as well as Arbitration of Land disputes. • Surveys. The official Government agency for land surveying and mapping. Its responsibilities include production, maintenance and distribution of accurate geographical data in form of various types of both analogue and digital maps in full range of scales. • Land Administration. Administration and management of private land, control and regulation of land use and property in respect of all categories of land and maintenance of land records. • Land Valuation. Valuation of land and assets for stamp duty, Government leasing including foreign missions, asset valuation, rating and development of National Land Value Index. • Land Registration. Registration of land transactions and other legal documents and determination of land and boundary disputes in collaboration with Surveys Department. 	Medium
National Government Administration Office	<ul style="list-style-type: none"> • Help community in advice and security • Help in education to the community in forest conservation Provision of enabling political goodwill	Low
Water Resources Authority (WRA)	<ul style="list-style-type: none"> • Implementation of the Water Act • protect catchment and riverine areas • Development, control, conserve and regulation of water resources • Assessment and Monitoring of water resources (quality and levels) • Conservation and protection of water catchment through collaboration with other stakeholders 	Low
Kenya Forestry Research Institute (KEFRI)	<ul style="list-style-type: none"> • Undertake research issues on trees, forest diseases, tree breeding, species trials and their documentation and dissemination • Technical orders development in conjunction with KFS • Supplying certified seeds to KFS, stakeholders and community members 	High
National Museums of Kenya (NMK)	<ul style="list-style-type: none"> • Karura Forest conservation, education programmes preparation and presentation through films, video shows and documentaries • Provide reference material on the Karura forest ecosystem • Conduct research on the past use of cultural sites within Karura Forest • Plant identification through the preparation of herbariums 	Medium
National Environment Management Authority	<ul style="list-style-type: none"> • Responsible for the management of the environment, and environmental policy 	Medium

Kenya Wildlife Service	<ul style="list-style-type: none"> • Management of wildlife 	High
Institute of Primate Research	<ul style="list-style-type: none"> • Management of primates 	High
Kenya Tourism Board	<ul style="list-style-type: none"> • Promotion of tourism in Kenya 	Medium
Nairobi City County Government	<ul style="list-style-type: none"> • Provision of enabling goodwill • Provision of licenses, way leaves, water etc 	Medium
INTERNATIONAL ORGANIZATIONS		
UNON, UNEP, UNDP, World Agro forestry Centre, ICIPE	<ul style="list-style-type: none"> • Funding and capacity building 	Low
CIVIL SOCIETY (NGOS AND CBOS)		
AFEW, Oshwal Community, Sukuma Twende, Drews Foundation, BIEA, Friends of City Park, Nature Kenya, Green Belt Movement, Seismology	<ul style="list-style-type: none"> • Afforestation and rehabilitation • Funding of CFA activities 	High
FKFCFA		
Residents' association for Muthaiga, Gigiri, New Muthaiga, Peponi, Runda, Whispers, Huruma Vision, Huruma New Dawn, Huruma Mushroom, Karuma, Deep Sea community	<ul style="list-style-type: none"> • Partnership with KFS in co-managing the forest through the FMA. • Stakeholders in Forest management (e.g. forest regeneration, forest development and maintenance, infrastructure building and maintenance, education, research, community patrols, monitoring) • Establish income-generating activities (IGA)/projects e.g. beekeeping to reduce over-dependence on the forest resources 	High
	<ul style="list-style-type: none"> • Liaise with key conservation agencies through memoranda of understanding (MoU) • Ecotourism ventures establishment • Indigenous conservation technologies/ knowledge dissemination to the present generation • Cooperation in fire prevention and suppression activities • Undertake conservation-related activities 	
PRIVATE SECTOR		
Various Kenya-based corporations	CSR donations to forest works and improvements	Medium
AFEW(K), APA Insurance, Barclays Bank, Davis & Shirtliff, East African Breweries Foundation, Safaricom, Airtel, G4S Kenya, George Drew Foundation, H Young & Co (EA), KPMG, Kul Graphics, Pelican Signs, Postel Directories (Kenya), Samsung Electronics EA, Sukuma Twende Trust, Access Kenya, Tree Biotechnology Trust	Funding afforestation rehabilitation and other activities	Low

4. PLANNING CONSIDERATIONS

Forest conservation in Kenya has faced many challenges over the last three decades that have been linked to weakness in policy and market failures. However, the Forest Conservation and Management Act 2016 focuses on forest development, conservation, participatory management in Kenya and responsiveness to stakeholder needs and priorities, thus fostering a positive attitude towards forest conservation. The new legislation promotes environmental sustainability through public participation, cooperation, and a more sustainable forest management approach.

The Forest Conservation and Management Act (2016) is to provide continuous guidance to all Kenyans on the sustainable management of forests. This involves taking cognizance of other existing policies relating to land and land use, tenure, agriculture, energy, environment, mining, wildlife, and water. The need for greater cooperation and linkage among resource owners, users, and resource planners, is recognized and recent policy incorporates forest-related values of the people of Kenya, as well as international concerns. Indigenous forest management, farm forestry, industrial forest development, dry land forestry, forest health and protection, private sector involvement and PFM are all seen as key components of forest management. The policy recognizes the benefits arising from the involvement of local communities and other stakeholders in forest management. Poverty reduction is identified as a goal with the forestry sector in the mainstream of economic recovery strategies. Most importantly, the policy emphasizes the importance of forests for water and biodiversity conservation and addresses cost and benefit-sharing.

4.1. RELEVANT POLICIES AND LEGAL FRAMEWORK

Policies and legislation governing the management of forests and protected areas have been taken into consideration in the development of this plan and the same will be enforced during the implementation stage to ensure the forest resources are properly managed and conserved.

The legislation and policies are briefly discussed hereunder.

4.1.1. The Constitution of Kenya

Chapter 5 of the Constitution of Kenya deals with Land and Environment, it clearly defines citizens' rights to a Clean and Healthy Environment. It stipulates the obligation of the Kenyan Government concerning the environment and natural resources, where forests and biodiversity are the key natural resources. The constitution clearly states that the Government must ensure the public participates in the management, protection and conservation of the environment and natural resources. The constitution recognizes and protects all forests in Kenya as a national resource.

4.1.2. Forest Policy

The Forest Policy provides a framework for improved forest governance, resource allocation, partnerships and collaboration with the state and non-state actors to enable the sector to contribute to meet the country's growth and poverty alleviation goals within a sustainable environment. The National and County governments must play their part in providing an enabling environment, effective extension service, forestry research and allocation of funds to the sector. Meaningful participation of stakeholders will continue to be sought through

regular consultation and discussions, to attain the most efficient, sustainable, and equitable use of forest resources. The main features of the draft policy framework for forest conservation and sustainable management related to Karura KPFMP include:

- The mainstreaming of forest conservation and management into national land-use systems.
- The devolution of community forest conservation and management, implementation of national forest policies and strategies, deepening of community participation in forest management by the strengthening of community forestry associations.
- The preparation of a national strategy to increase and maintain forest and tree cover to at least 10% of the total land area and for the rehabilitation and restoration of degraded forest ecosystems, and the establishment of a national forest resource monitoring system.
- The adoption of an ecosystem approach for the management of forests, and recognition of customary rights and user rights to support sustainable forest management and conservation.

4.1.3. Forest Conservation and Management Act 2016

Forest Conservation and Management Act was enacted in 2016 to give effect to Article 69 of the Constitution regarding forest resources; to provide for the development and sustainable management, including conservation and rational utilization of all forest resources for the socio-economic development of the country and connected purposes. The Act has entrenched management plans as mandatory in the new legislation in forest management, and the involvement of other relevant stakeholders in preparing the plan is inevitable under a PFM arrangement. The Act repealed the Forests Act 2005 and has attempted to define various forest management terminologies more clearly. For the first time it has defined a forest as land which is declared or registered as a forest, or woody land which is declared or registered as a forest, or woody vegetation growing close to an area of over 0.5 of hectares including a forest in the process of establishment, woodlands, thickets. The “community” is clearly defined group of users of forest land identified based on ethnicity, culture or similar community of interests as provided under Article 63 of the Constitution. A “forest management plan” is defined as a written document establishing direction and goals for the management, conservation, and utilization of a specific forest land area. A community forest association registered under this section may apply to the Service for permission to participate in the conservation and management of a public forest. Section 49 (1) describes the obligations of a CFA which include: protect, conserve and manage the forest or part of the forest in accordance with an approved forest management agreement entered into with the Service and the provisions of the management plan for the forest.

4.1.4. Environmental Management and Co-ordination Act (EMCA) of 2015

The Environmental Management and Coordination (Amendment) Act of 2015, embraces all environmental management issues in the country. The Act has been a great boost in addressing the environmental concerns geared towards safeguarding against environmental degradation within and outside protected areas.

The Act provides the legal framework for the implementation of NEAP, which gives due regard to ensuring that people live in a healthy environment. It also emphasizes maximum

participation by stakeholders in the development and implementation of policies, plans and processes for the management of the environment. The impact of this Act ensures good practice in the implementation of activities and where proposed activities are deemed to have negative impacts on the environment, then an Environmental Impact Assessment (EIA) should be undertaken to provide environment management plan (EMP) to mitigate the anticipated negative impacts.

4.1.5. The National Environment Action Plan (NEAP)

This is a policy document drawn in 1994, on the protection and management of the national environment and natural resources on a long-term basis whose proposals include:

- Review of land use legislation and planning to increase productivity,
- Reduce land use conflict
- Protection of the water catchments and fragile ecosystems.
- Biodiversity conservation in forest areas

Its impact in this plan will be to ensure that the proposed activities do not adversely affect the integrity of the ecosystem and where such activities are deemed injurious to the forest reserve then EMCA regulations should apply.

4.1.6. Water Act, 2016

The Water Act lays out a mechanism for the development of a national water resources management strategy, for the protection, management, use, development, conservation and control of water resources and water sources. The strategy devolves the authority over the conservation of water catchment areas to local stakeholders to manage them in collaboration with Water Resource Authority (WRA) and Water resource users' associations (WRUAs) established under the Act.

The Act mandates the minister responsible for water resources to ensure that water catchment areas are protected. The Minister is also mandated to declare such areas as water catchment areas. Several rivers dissect Karura Forest whose flow will be enhanced by its protection and rehabilitation.

4.1.7. The Wildlife Conservation and Management Act, 2013

The Wildlife Conservation and Management Act, 2013 mandates the Kenya Wildlife Service (KWS) to manage and conserve wildlife within and outside protected areas and to support community initiatives towards wildlife conservation. It also mandates KWS to play an advisory role and provide flexible regulations that enable the generation of optimum returns from wildlife through non-consumptive uses.

There are no large wildlife species in the Karura Forest Reserve and therefore there are no human-wildlife conflicts that are associated with the presence of large such as elephants, large carnivores etc. There is, nevertheless, a large wildlife presence in Karura Forest Reserve, including an increasing colobus monkey population.

The relative sizes and variations of the larger mammal populations are well-known thanks to the use of nine motion-activated camera traps, but the exact size is yet to be established. There is need therefore to undertake a study detailing the wildlife in the forest.

4.1.8. National Energy Policy and Energy Act, 2019

The policy ensures that the relevant ministries, NGOs, and other organizations address environmental problems associated with the supply and use of energy (charcoal, fuel wood and other forms of energy). The broad objective of the energy policy is to ensure adequate, quality, cost-effective and affordable supply of energy to meet development needs while protecting and conserving the environment.

Other policies and Government drives that relate to Energy Act touches on Firewood, Charcoal, biomass, Biogas, Co-generation using Bagasse, improved stoves and use of briquettes. Utilization of solar energy, wind, biodiesel, geothermal, hydropower and small hydro's fall under this Act.

4.1.9. The Societies Act Cap 108, (Revised in 2009)

Societies in Kenya are registered under this Act. The function of the Registrar of Societies provided for under the Act is to maintain a public register and to receive documents that Societies are obliged to file. These are principally applications for registration, incorporation, changes to the registered office, alterations to the registered rules/constitution and the annual financial/KRA returns statements among others. The Registrar has powers of inspection to ascertain that Societies are complying with the Act, but these do not extend to intervening in internal matters within a Society. FKFCFA is encouraged to maintain compliance with the requirements of this Act as it is a pre-requisite before entering into a Forest Management Agreement (FMA) with KFS.

4.1.10. Tourism Act 2012

This Act concerns the development, management, marketing and regulation of a sustainable tourist industry in Kenya. It provides for the control of tourist activities through licensing and registration. It requires the Minister to formulate and publish in the Gazette a national tourism strategy at least once every five years and provides for the establishment of various institutions including: the Tourism Regulatory Authority, the Tourism Protection Service and the Kenya Tourism Board.

4.2. LINKS TO MULTILATERAL AND ENVIRONMENTAL AGREEMENTS

4.2.1. The Convention on International Trade in Endangered Species of Flora and Fauna (CITES)

This Convention regulates international trade in wild plants and animals that are at risk of extinction because of trade. The convention seeks to control trade not only in live species but also in dead specimen and their derivatives. CITES identifies the species that it protects and classifies them into three categories, those that are currently at risk of extinction, those that probably may be at the risk of extinction if the trade in them is unregulated and finally those that member states have listed since they are under-managed and require the co-operation of other states to succeed.

Kenya ratified the Convention in 1978 and it has been domesticated in the Wildlife Conservation and Management Act. Karura Forest is home to a threatened subspecies of Colobus monkeys and *Prunus africana* which is under presidential protection against exploitation.

4.2.2. United Nations Framework Convention on Climate Change (UNFCCC)

The objective of this convention is to establish methods to minimize global warming and in particular the emission of greenhouse gases. The UNFCCC requires that all parties stabilize greenhouse gases concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed sustainably. The management plan addresses this convention through rehabilitation of degraded areas, which will serve as important carbon sinks to minimize greenhouse gases in the atmosphere.

4.2.3. Kyoto Protocol to UNFCCC, 1997

The Kyoto Protocol required signatories to reduce their greenhouse gas emission levels to 5% below 1990 levels by the year 2012. Kenya falls under Non-Annex I for developing countries that have no green-house gas emission reduction obligations but may participate in the Clean Development Mechanism. Kenya is already engaged in the sale of carbon credits and as recent research has shown that Karura Forest is a significant carbon sink in the Nairobi areas, the CFA in Karura could benefit in this trade.

4.2.4. Sustainable Development Goals (SDGs)

Sustainable Development Goals (SDGs) are intended to be universal in the sense of embodying a universally shared common global vision of progress towards a safe, just and sustainable space for all human beings to thrive on the planet. This plan addresses the following SDGs:

Goal 1. End poverty in all its forms everywhere.

Goal 7. Ensure access to affordable, sustainable, and reliable modern energy services for all.

Goal 13. Take urgent action to combat climate change and its impacts.

Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forest, combat desertification, halt and reverse land degradation and halt biodiversity loss.

Forests cover 30 per cent of the Earth's surface and in addition to providing food security and shelter, forests are key to combating climate change, protecting biodiversity and the homes of the indigenous population.

4.2.5. African Convention on the Conservation of Nature and Natural Resources

The convention came into force in 1969. It reaffirms the importance of natural resources both renewable and non-renewable, particularly soil, water, flora and fauna. The objective is to facilitate sustainable use of these resources. It emphasizes preventive and precautionary measures to conserve and preserve these natural resources.

This Convention is relevant to Karura Forest, which in its capacity as a conservation forest, is managed to conserve nature and natural forest resources within its boundaries.

4.2.6. East African Forest Policy and Strategy

In 2018, East African countries started developing a harmonized forest policy and strategy to increase forest cover and contain drought. The Intergovernmental Authority on Development (IGAD) countries who met in Nairobi said the initiative was aimed at improved contributions of forests resources to national economies for poverty reduction, environmental sustainability and development of the IGAD member states. "The initiative would contribute to the increment of forest cover to help contain drought that has been a major problem in the Horn of Africa. The regional bloc was mandated with the responsibility of managing drought and desertification but over a period of time, changed to sustainable development but drought continued to worsen productivity in the region. The solution was to develop a harmonized forest policy and strategy to help increase forest cover to improve rainfall pattern, increase food security, address water problem and help address climate change. Once the forest policy and strategy become effective, it would help address issues on socio-economic benefits of the forestry sector.

4.2.7. Africa Agenda 2030

The 2030 Agenda is based on the concept of global partnership, supported by a comprehensive approach to the mobilisation of all means of implementation, and is complemented by the Addis Ababa Action Agenda which is an integral part.

The 2030 Agenda itself consists of 4 sections:

- i. A political Declaration
- ii. A set of 17 sustainable Development Goals and 169 targets
- iii. Means of Implementation
- iv. A framework for follow up and review of the Agenda.

The scale, ambition and approach of the Agenda are unprecedented. One key feature is that the SDGs are global in nature and universally applicable, taking into account national realities, capacities and levels of development and specific challenges. All countries have a shared responsibility to achieve the SDGs, and all have a meaningful role to play locally, nationally as well as on the global scale. In addition, the 2030 Agenda integrates in a balanced manner the three dimensions of sustainable development – economic, social and environmental. The 2030 Agenda is also indivisible, in a sense that it must be implemented as a whole, in an integrated rather than a fragmented manner, recognizing that the different goals and targets are closely interlinked. Moreover, in order to ensure progress and long-term accountability, the 2030 Agenda includes a strong follow-up and review mechanism which will allow all partners to assess the impact of their actions. At global level, this is overseen by the High-level Political Forum on Sustainable Development, which meets at UN Headquarters every year to track progress

4.2.8. Convention on Global Biodiversity

This Convention aims to conserve biological diversity, sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. Kenya ratified the convention on 26 July 1994. The country has undertaken activities that are consistent with the goals of the Convention, and has developed a national strategy for the conservation of biological diversity and established a system for protecting endangered species both in the protected and dispersal areas.

4.2.9. UN strategic plan for forests 2017-2030

The agreement on the first-ever UN Strategic Plan for Forests was forged at a special session of the UN Forum on Forests held in January 2017 and provides an ambitious vision for global forests in 2030. The plan was adopted by the UN Economic and Social Council on 20 April 2017, and was subsequently adopted by the UN General Assembly on 27 April 2017.

- The Strategic Plan features a set of six Global Forest Goals and 26 associated targets to be reached by 2030, which are voluntary and universal.
- It includes a target to increase forest area by 3% worldwide by 2030, signifying an increase of 120 million hectares, an area over twice the size of France.
- It builds on the vision of the 2030 Agenda and recognizes that real change requires decisive, collective action, within and beyond the UN System.

4.3. LINKS TO NATIONAL PLANNING PROCESS

This plan recognizes other planning processes from local to national level that may affect how the plan is implemented.

4.3.1. Vision 2030

This is the country's development blueprint that aims at making Kenya a newly industrialized middle-income country providing high-quality life for all its citizens. Vision 2030 clearly recognizes the role of well-managed, natural forests in attaining its set targets: Karura, as a conservation forest, is contributing to these targets, the management of invasive species and providing a clean and healthy environment for Nairobi urban community is a case in point.

Some of the Flagship Projects for the Environment are:

- The water catchment management initiative- Rehabilitating the water towers.
- The Wildlife Corridors and Migratory Routes Initiative- reclaiming all wildlife corridors and migratory routes.
- The Land Cover and Land Use Mapping Initiative – Comprehensive mapping of all land use pattern in Kenya
- A clean and healthy environment for every citizen.
- Sustainable utilization of natural resources
- Increase forest cover to 4% by 2012 and up to 10% by 2030
- Control of invasive species to restore degraded areas

4.3.2. The National Forest Programme (2016-2030)

The National Forest Programme (NFP) is a strategic national framework to guide forest sector development in Kenya. The NFP takes over from the Kenya Forest Master Plan (KPFMP, 1994). Chapter 5, Section 5.7 of the NFP addresses forestry in a devolved system, taking cognizance of the shared responsibility of the National and County governments in meeting the national target of 10% forest cover. The NFP outlines several strategies under eight (8) clusters for forestry development in Kenya. One of the strategies under the Natural Forest management and conservation cluster is to, "Promote participatory forest management through CFAs and other natural Resource-based community organizations". Community participation is also captured in the strategy, "Improve Community and special interest

groups' participation in decision making in the forest sector dissemination networks" under the Forest Governance Cluster.

4.3.3. KFS Strategic Plan (2018-2022)

It recognizes the community and other stakeholders' participation in forest management. It links poverty with forest degradation and proposes mobilization, awareness creation and participation in forest management to address the same.

The plan aims at empowering the community through the formation of Community Forest Associations and the development of participatory forest management plans. The strategic plan supports livelihood improvement activities such as IGA's in the forest and adjacent area.

4.4. RATIONALE FOR MANAGEMENT PLANNING

4.4.1. Importance for the general public

Karura Forest receives a wide range of visitors daily whose interests are variable, some of which include:

- To provide an opportunity to educate the general public on the importance of forests.
- To contribute to the mitigation of climate change.
- To serve as a venue for recreation.
- To provide seedlings.
- To provide training in environmental and natural resource management.

4.4.2. Employment

Initially, before 2010, the forest station had only KFS a skeleton staff and little equipment.

At present 26 people are employed by the forest station, namely: one forester; one assistant forester; 12 rangers, and 12 casuals.

The Joint Management Committee presently employs through FKFCFA 99 persons as scouts, clerks, tree-carers, administrative staff, and many casual workers for clearing and planting in the forest.

Many employment opportunities have been created particularly for the inhabitants of Huruma, Githogoro and Deep Sea informal settlements.

4.4.3. Watershed conservation

The forest contributes on average 10 million cubic meters of rainfall per year to recharging the rivers that run through it and the aquifers below. It is proposed to boost this by planting bamboo and other water conservation vegetation along the five rivers.

4.4.4. Biodiversity reservoir

Karura Forest hosts a wide diversity of fauna and flora species. Further protection of these species will be provided once a full biodiversity inventory has been completed as part of the present plan

4.4.5. Historical and Cultural importance

There are three caves in Karura Forest which were used by the Mau-Mau during the uprising for independence. These caves have also in the past served as venues for spiritual nourishment for many people from different parts of the country.



Plate 2: The largest cave in the Karura River valley from the inside during archaeological excavations by a team from the National Museums of Kenya

4.4.6. Source of Forest Products

- *Wood products*

The plantations are mostly passed their economic rotation age and will be replaced with indigenous species. The plantations are a source of wood products like timber, poles, withies, and fuel wood.

Brachylaena huillensis (Muhugu) has been used historically for wood carving sold to tourists. This valuable indigenous tree species is now only found thinly scattered within the forest.

- *Non-wood forest products*

At present, the Forest caters for the supply of small businesses such as beekeeping.

4.4.7. Tourism and recreation opportunities for Kenyans

Karura now hosts an average of nearly 40,000 visitors a month (see Fig. 5) and has become the No. 2 attraction visited area in Nairobi according to Trip Advisor.

During this plan period, only listed ecotourism activities in the plan will be implemented.

However, as Karura Forest is a small forest, surrounded by hotels, there will be no new tourism-related permanent or high impact structures in the forest including campsites.

Plate 3: The much-visited Karura River Waterfall during the rains

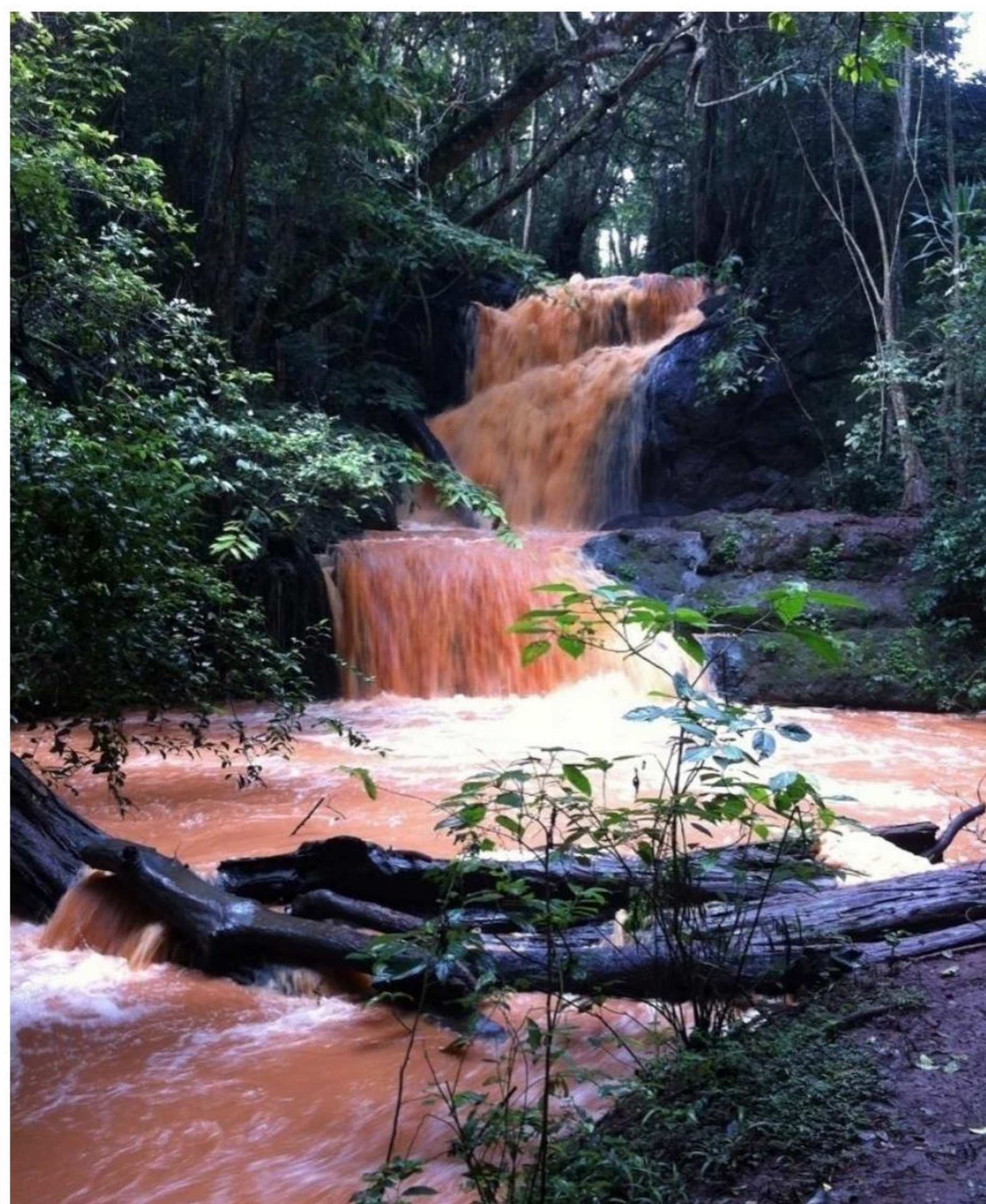


Plate 4: New signage at Junction 5

Plate 5 (right): Meditation area in an over-mature Araucaria plantation in the forest near the Ruaka Picnic Site



Plate 6: Installing the memorial plaque to Prof. Wangari Maathai at the newly opened Wangari's Grove in the northwest corner of the Main Forest Block

4.4.8. Research and Education Centre

The forest offers many research and education opportunities for various institutions such as NMK, universities and other organisations including KEFRI in the form of:

- Internships
- Attachments
- Case studies
- Karura Education tours
- Hosting exchange visits.

There is a need to provide visitors to the forest with an opportunity to learn the importance of forests and the significant role they play in their everyday lives.

The Karura Forest Environment Education Centre (KFEET) was established in 2010 within the former Shell-BP Sports Club premises to promote environmental education, provide a centre for learning about forest ecosystems, whilst retaining low-impact sports and recreation facilities to generate revenue in support of Karura. The trust founder members are Kenya Shell limited (now Vivo Energy Kenya), the Kenya Forest Service, the Green Belt Movement, Friends of Karura Community Forest Association and the Oshwal Education and Relief Board.

Within the five-year term of the KPFMP, KFEET will be further developed to provide opportunities for visitors to learn about Kenya's forests as well as other forests around the world. The centre will draw from information and expertise from close neighbours, such as UNEP and ICRAF, national/international universities and government agencies.

4.4.9. Environmental services (including carbon sinks, soil conservation)

- **Carbon sink**

One-third of greenhouse gases build up in the atmosphere is estimated to result from changes in land use. Afforestation and conservation of forests can significantly contribute to mitigating climate change. Nairobi once had a reputation as a healthy place to live and was known as 'The Green City in the Sun'. However, the increasing carbon emissions in Nairobi are attributed to the ever-growing and intense industrial activity and use of automobiles. Therefore, Karura Forest has a vital role to play in mitigating those negative impacts. Land-use change and forestry activities during the plan period will focus essentially on the development and regeneration of the indigenous forest. There is also scope for partnering in one of the carbon financing schemes.

- **Soil and Water Conservation**

The forest is able to retain the amount of rainfall falling over it through infiltration, only gradually releasing it to the streams flowing through the forest. It is also useful in recharging underground water streams. These actions contribute towards minimizing soil erosion and this protects the habitat for wildlife.



Plate 7: Waterfall on Ruaka River in cleared and recovered area upstream from Mji ya Huruma: aeration in action.

4.4.10. Threats and constraints to forest conservation

The main anthropogenic threats in Karura forest are from unsettled court cases on forest land that could lead to potential conversion of forests to other land uses or uncontrolled developments incompatible with the status of Karura as a conservation forest.

On the biological side, the main threats are invasive species that crowd out and compromise the recovery of indigenous species, river pollution from effluents from the surrounding neighbourhoods, and soil erosion from loss of vegetative cover attendant to uncontrolled peri-urban development.

In addition to the threats identified, the conservation of Karura Forest faces the following challenges:

- The high number of visitors, particularly on weekends or during major events.
- Need for a slow pace of replacement of plantations with indigenous species in a recreational conservation forest.
- The logging ban of November 2018 prevents conversion of plantations to indigenous.
- Inadequate funding in relation to major infrastructure development aspects in the forest.

4.4.11. Vision, purpose, and main objective of the plan

Vision: To make Karura Forest a secure and safe, world-class sustainably managed urban conservation area

Purpose:

Karura Forest Reserve to be a protected natural forest ecosystems to sustainably provide ecosystem goods and services through enhanced stakeholders' participation leading to improved quality of life for all.

Objective:

To achieve and sustain a conservation Forest through stakeholders' participation for provision of ecosystem goods and services for the residents of Nairobi and beyond

4.5. FOREST MANAGEMENT AND UTILIZATION ZONATION

The forest is divided into two blocks, Sigiria and Karura. Sigiria is mainly comprised of plantations. The Karura block has the biggest area of natural forest although it also has plantations.

The Forest Reserve has been zoned using the multiple-use classification criteria, which considers the application of the primary use along with secondary uses of the zoned areas. The main zones identified are:

- Indigenous forest area
- Wetlands and riparian areas
- Exotic plantations
- Developed areas

Table 12: Zonation criteria (2021-2026)

Zone	Criteria	Management Objectives	Management Options
Indigenous forest area	-Water catchment -Wildlife habitat -Protection of biodiversity	Conservation of biodiversity and wildlife habitat	-Conservation area Research and education
	Swamps/ marshlands/ riparian areas	Conservation of the wetlands	-Conservation of the area - Research and bird watching
Recreation areas	Ecotourism values	Conservation of amenity areas featuring aesthetic values	-Minimum impact ecotourism
Exotic plantations	Area under senescent eucalyptus and wattle plantations	Production of poles, timber	Convert them into indigenous forest at a rate of 15 ha per year
Developed areas	Areas under residential and non-residential buildings, tree nurseries etc.	-Area to continue serving the same purpose -Generation of revenue	Maintain existing areas sustainably

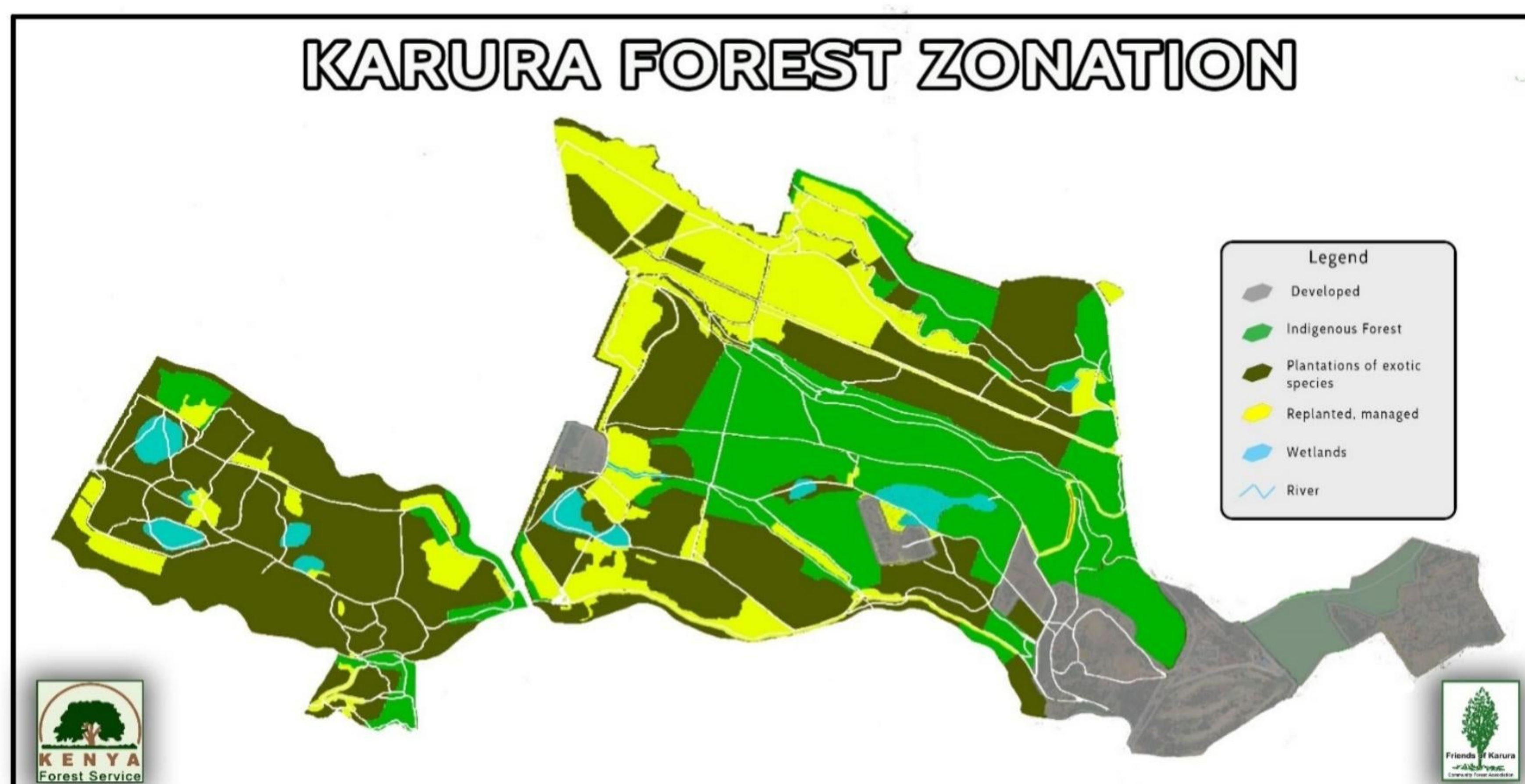
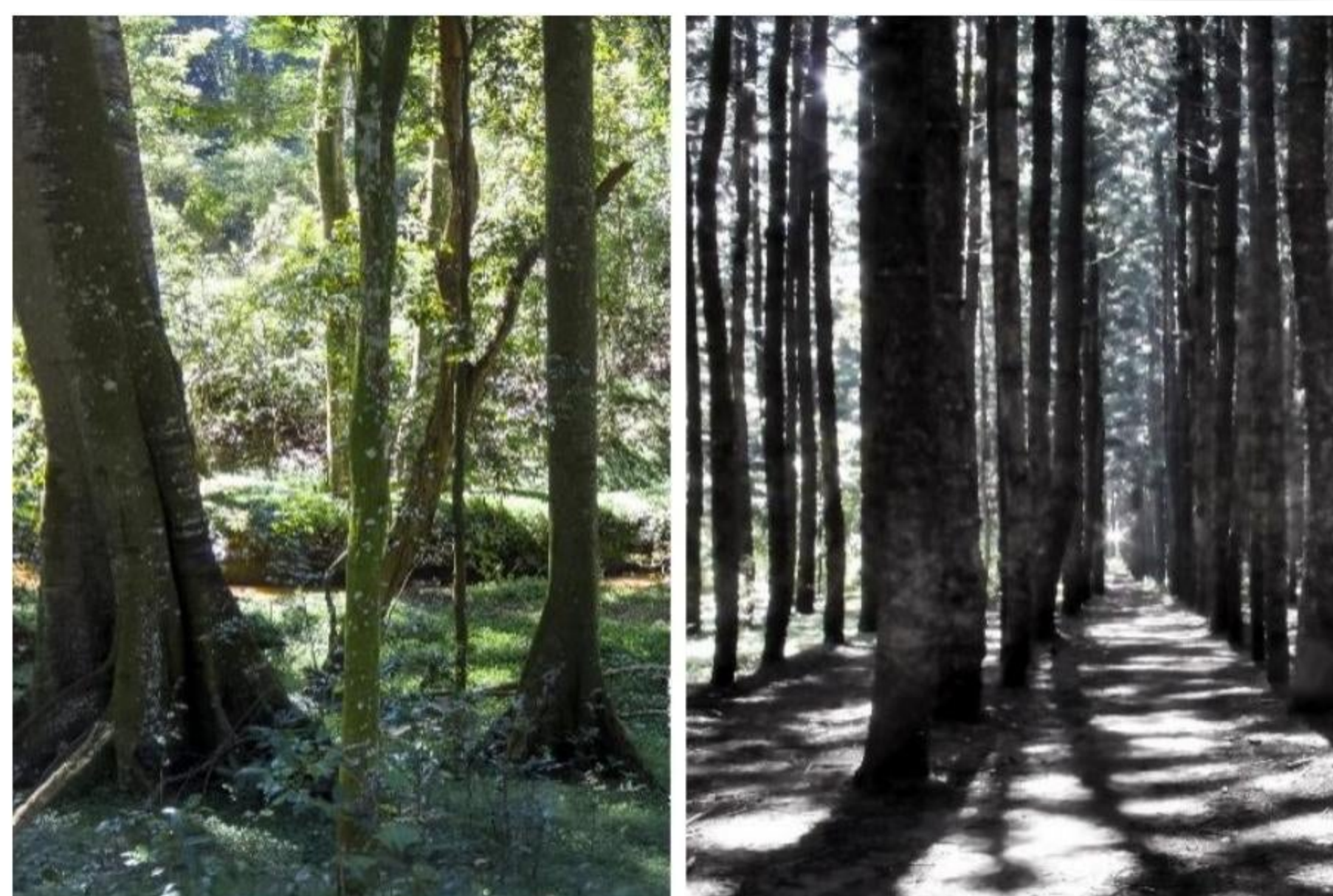


Figure 6: Karura cover type zones (Source Karura Forest sheet 1:10,000 updated by FKFCFA with Google Earth 2019 Digital Globe coverages and ground-truth GPS delineations of managed parcels)

Plate 8: Two zones. Left, indigenous riverine forest in the Karura River valley. Right, an over-mature *Araucaria* plantation near Junction 12



5. MANAGEMENT PROGRAMMES

This is the third participatory forest management plan (KPFMP) for Karura Forest Reserve. Following the successful implementation of the previous KPFMPs (2010-2015, 2016-2020), the overall objective of the third plan is to continue to manage and conserve Karura Forest sustainably for provision of goods and services to Nairobi residents in accord with the 2021 Forest Management Agreement.

For the purposes of this plan, activities shall be restricted to the area specified and delineated in the 26 April 2021 Forest Management Agreement (FMA)

The specific management objectives that will guide the implementation of the plan are:

- 1) To rehabilitate degraded parts of Karura Forest to a healthy, productive indigenous closed-canopy forest and ensure the achievement of sustainable management in order to enhance forest habitat for indigenous wildlife species, conserve biodiversity, and protect water resources.
- 2) To keep the forest safe and secure for the enjoyment of all. This would entail the protection of the forest from any high impact development other than forestry activities and, ensure ecotourism proposals would be in the best interest of the forest.
- 3) To contribute to the improvement of the livelihood of the local communities.
- 4) To promote low impact ecotourism
- 5) To promote environmental education and research in forestry.
- 6) To have in place the necessary infrastructure, vehicles, machinery, and equipment.
- 7) To provide for optimum human resources for implementing the management plan.

Implementation of the plan will be guided by the above management objectives for which strategies and actions are proposed hereunder.

5.1. NATURAL FOREST MANAGEMENT PROGRAMME

5.1.1. Programme purpose

A fully-functioning, well-protected natural forest ecosystem to meet the environmental and recreational needs of the residents of Nairobi and beyond

5.1.2. Background

Exotic plantations remaining occupy 353 ha, and original or recovered indigenous forest covers 511 Ha of the area managed under the FMA (see Table 6) . During the first and second KPFMPs, many corporate Institutions and other stakeholders teamed up with KFS and FKFCFA in rehabilitation activities and 215 ha were cleared of invasive species and replanted. The current areas that require to be rehabilitated are as shown on Figure 7.

The critical water catchment areas will be protected, and the riparian areas will be rehabilitated with bamboo and other water-friendly species.

Key elements and a compartment-based strategy for proposed felling plant for the *Eucalyptus* plantations is presented in Appendix 5.



Plate 9: Strategic clearing of invasive species requires coordinated work by community members from all walks of life. Clockwise, from upper left: Mji ya Huruma groups replanting in Wangari's Corner; another group clearing invasive *Lantana camara* between Junctions 12 and 12a; one year's regrown after clearing and replanting along Wangari Maathai Track between Junction 30 and 41a; corporate-sponsored tree-planting event near River Café

5.1.3. Management issues

- Due to the logging ban in place since 2018, no logging activities could take place to replace the plantations.
- Removal of *Lantana camara* and *Caesalpinia decapetala* (Mauritius thorn) is difficult due to the thorns along the stems, the difficulty in removing all the roots and the easy germination of the seeds, requiring frequent weeding until the ground is covered with grass.
- Managing the fast regrowth of invasive species
- There is a need to carry out planting operations during the rainy season. However, some corporate partners insist on planting at the wrong time.

5.1.4. Management Objectives

- To rehabilitate degraded 75 ha of Karura Forest to a healthy and productive closed-canopy forest while ensuring sustainable management.
- To enhance ecosystem resilience in providing ecosystem services.

Table 13: Summary of management actions for the Natural Forest Management Programme

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE
				1	2	3	4	5	
Objective: To rehabilitate degraded 75 ha of Karura Forest to a healthy and productive closed-canopy forest									
Revert aged plantation into natural forest, priority to areas under wattle	Ha	75	Reports, records, maps	15	15	15	15	15	KFS & FKF
Update the compartment registers on areas reverted to indigenous	No	5	Compartment register	1	1	1	1	1	KFS
Update the map showing the status of each plantation stand	No	1	Map	1					KFS & CFA
Implement the established set of rules for planting trees in the forest as indicated in Appendix 4	No	1	Records	1					KFS & FKFCFA
Revise stakeholder engagement guidelines to include appropriate timing for planting	No	1		1					KFS & FKFCFA
Clear areas invaded by <i>Lantana camara</i> , <i>Caesalpinia decapetala</i> and other invasive spp and replant with indigenous species suitable for Karura incl. bamboo along watercourses	Ha	70	Site visits, photos, records	15	15	15	15	10	KFS & FKFCFA
Promote alternative sources of energy to reduce dependence on firewood collection from the forest	No.	5	Records	1	2	2			KFS & FKFCFA
Provide employment to women’s and other groups from the neighbouring community to carry rehabilitation work	No	8	Records, site visits, photos	X	x	X	x	x	KFS & FKFCFA
Train staff in tree tending	No	50	Records, site visits, photos	10	10	10	10	10	CFA
Raise appropriate tree seedlings	No.	100,000	Records, site visits, photos	20,000	20,000	20,000	20,000	20,000	KFS & FKFCFA

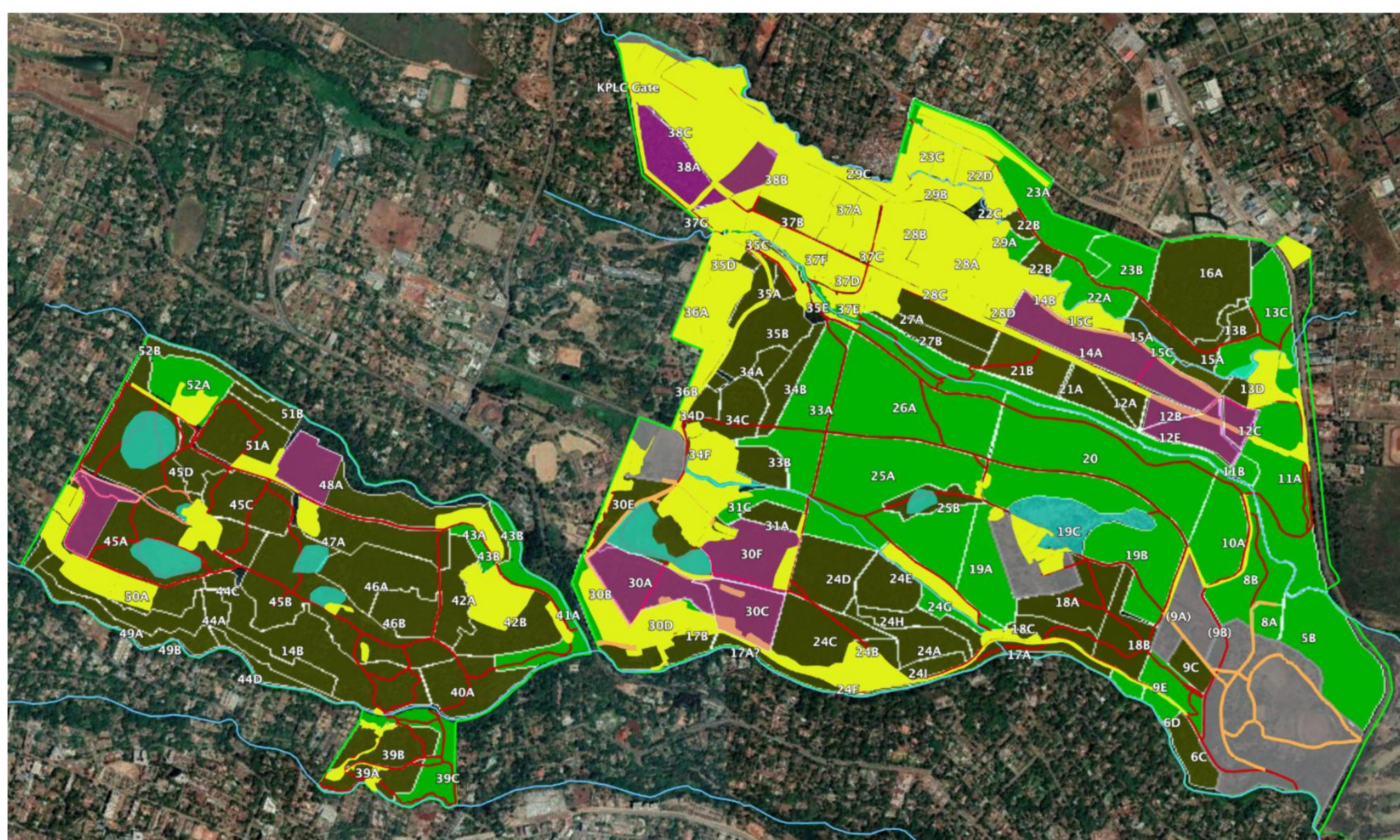


Figure. 7. Clearing and replanting targets, 2021-26. Zonation as in Fig. 6 legend. Purple areas indicate the KFS management compartments, totalling ca. 75 ha, proposed to be cleared of old Eucalyptus plantations and re-planted with indigenous tree species between 2020 and 2024 inclusive (see Table 8).

Area	Size	Year
38A	9.5	2021
38B	4.3	2022
14A	13.7	2022
12B	1.9	2023
12C	2.2	2023
12E	4.7	2024
30F	9.3	2024
30A	9.5	2025
30C	7.1	2025
45A	7.2	2025
48A	5.6	2026
TOTAL	75	

Table 14. Shows the approximate areas (in ha) of the proposed management areas proposed to be cleared of old Eucalyptus plantations and re-planted with indigenous tree and shrub between 2021 and 2026 inclusive (see Fig. 5).

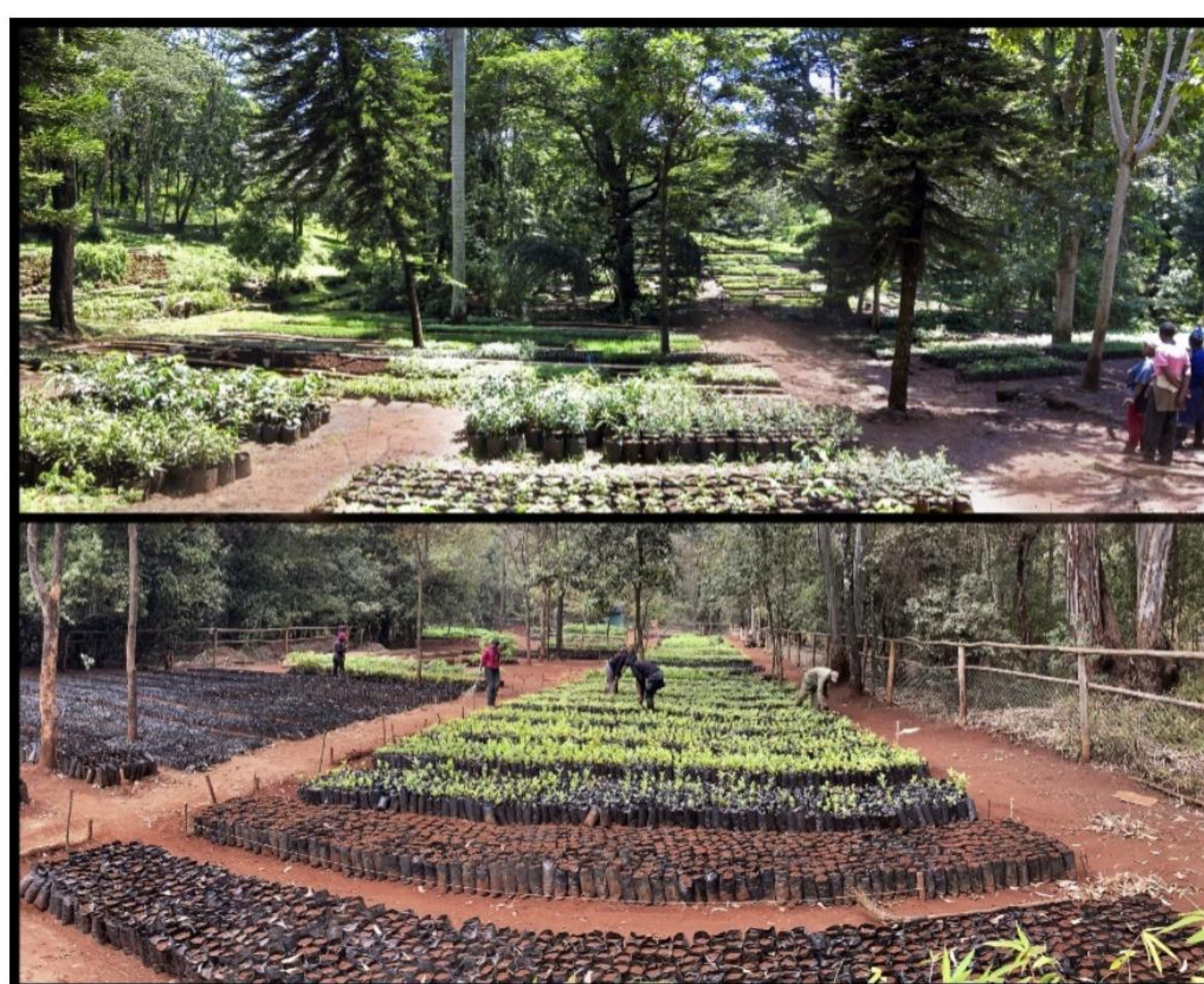


Plate 10 Karura Forest Tree Nurseries. Above, KFS nursery at KFS Headquarters. Below, FKFCFA indigenous tree and shrub nursery near River Café.

5.2. FOREST SECURITY AND SAFETY PROGRAMME

5.2.1. Programme purpose

A secure and safe Karura Forest to provide ecosystem services and enjoyment for all.

5.2.2. Background

There is a need to re-establish the boundary to ensure that all beacons are present. Karura forest has no title deed but was established through a legal notice.

5.2.3. Management issues

- Cancellation of title deeds illegally issued in the forest is difficult due to bureaucratic nature of the process and political interference.
- Fire breaks are difficult to maintain due among others to aggressive growth of invasive species
- Motorised access to the Mazingira Block is limited.
- Funding for maintenance of electric fence and its river crossings
- Physical and spatial constraints of main entry points.
- Availability of staff during peak visiting times to patrol, secure, and ensure proper management of entry points

5.2.4. Management Objective

To keep the forest secure and safe

Table 15: Summary of management actions for Forest Protection and Security Programme

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE
				1	2	3	4	5	
Objective: To keep the forest safe and secure for the enjoyment of all									
Work with the National Land Commission for the revocation of illegal titles	No	5	Court rulings, records	1	1	1	1	1	KFS, FKFCFA, Land Commission
Work with the Nat. Land Commission to obtain a title deed for the forest	No	1	Court rulings, records	1	0	0	0	0	KFS, FKFCFA, Land Commission
Partner with National Police Service (NPS) to promote conservation of Mazingira block	No	1	Reports, photos, site visit					1	KFS & FKFCFA and NPS
Maintain the electric fence and its 12 river crossings	No	12.6km	Reports, photos, site visits	x	x	x	x	x	KFS & FKFCFA
Improve management of entry points through e.g. automation	No	4	Records, statistics, inspections	x	x	x		x	KFS & FKFCFA
Maintain the current fire breaks	No	5	Reports, photos, site visits	1	1	1	1	1	KFS & FKFCFA

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE
				1	2	3	4	5	
Establish a fire outbreaks surveillance system	No	1	Report					1	KFS & FKFCFA
Patrol all parts of the forest by the forest Rangers and community scouts	No	various	Reports, duty roster, photos	X	X	X	X	X	KFS & FKFCFA
Train scouts and forest Rangers in fire fighting	No	5	Reports on training sessions	1	1	1	1	1	KFS & FKFCFA
Prepare a disaster and risk preparedness response plan	No	1	Reports		1				KFS & FKFCFA

5.3. COMMUNITY AND OUTREACH PROGRAMME

5.3.1. Programme purpose

To nurture an engaged and supportive constituency amongst the forest adjacent communities to ensure a sustainable future of the forest and to replicate and promulgate a workable and adaptable model for participatory forest management by CFAs throughout Kenya.

5.3.2. Background

The Karura Forest Reserve has for over a decade been piloting the CFA concept. Its success has come about through a structured and collegiate working relationship between KFS and FKF, a sound system of financial management, harnessing stakeholder participation and expertise, and active outreach to the public through social media and community participation. This model could be useful to other CFAs striving to practice participatory forest management.

Currently, KFS & FKFCFA are working to serve the needs of the communities residing around the forest. Some communities benefit by getting employment, contract and casual work for tree planting, maintenance of tracks, clearing of invasive species, and collection of firewood and also bee keeping in the forest, whereas other communities use the forest for recreation.

5.3.3. Management issues

- CFAs facing lack of information and experience in practicing participatory forest management
- Meet the high expectations of the surrounding communities
- High poverty incidences among some communities
- High demand for a recreation area for some communities

5.3.4. Objectives

- To sustainably meet the needs of targeted adjacent forest communities
- To mentor other CFAs aspiring to practice participatory forest management

Table 16: Summary of management actions for the Community & Outreach Programme

Table 16: Summary of management actions for the Community & Outreach Programme										
ACTION		UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE ORGANISATION(S)
					1	2	3	4	5	
Objective: To sustainably meet the needs of the forest adjacent communities										
Support forest based, ecosystem friendly, income generating activities for target communities		No	Various	Reports	x	x	x	x	x	KFS & FKFCFA
Prioritize target communities in current and future recruitment of staff		No.	Various	Payroll	x	x	x		x	KFS & FKFCFA
Give priority to youth and women groups from community when awarding appropriate contracts		Groups	20 s	Financial records	4	4	4	4	4	KFS & FKFCFA
Create employment through the development of low impact recreational activities		No	5	Reports	1	1	1	1	1	KFS & FKFCFA
Expand the bursary program to benefit more needy children of adjacent communities		No	200	Reports	40	40	40	40	40	FKFCFA
Objective: Mentoring other CFAs aspiring to practice participatory forest management										
Hold workshops with other CFAs		No	5	Reports, photos	1	1	1	1	1	FKFCFA
Organise field visits to and from other CFAs		No	10	Reports, photos	2	2	2	2	2	FKFCFA

5.4. ECOTOURISM PROGRAMME

5.4.1. Programme purpose

To make Karura an accessible conservation forest readily available to all for purposes of low-impact, sustainable eco-tourism

5.4.2. Background

Karura Forest has evolved from a no-go place of danger in 2009 to a much-loved public amenity with nearly 40,000 visits a month, mainly by Kenyans. The demand for ecotourism is commensurate with the rapid growth of Kenya's major urban centre, Nairobi. Particularly during the time of Covid-19 restrictions, Karura's value to the people of Kenya as a refuge and

place of re-creation is inestimable and must be managed carefully in order not to compromise the forest's capacity for providing ecosystem services as well as respite. Ecotourism guiding programmes have been successfully trialled.

5.4.3. Management issues

- High expectations of the surrounding communities
- Balancing amenities with sustainable forest ecosystem conservation
- Managing high numbers of visitors during peak times.
- Physical limitation of visitor access points into forest including parking
- The need to reduce pressure on Karura by helping and encouraging other Nairobi peri-urban forests to become safe and secure attractors of public utilisation

5.4.4. Management objective

To manage the large number of visitors to Karura, providing them with a unique visiting experience, whilst safeguarding the forest ecosystem in as natural a state as possible.

Table 17: Summary of management actions for the Ecotourism Programme

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONS-IBLE ORGANI-SATION(S)
Objective: To manage the large number of visitors to Karura whilst safeguarding the forest ecosystem									
Promote low or no impact, ecosystem-friendly ecotourism activities and amenities in the forest, like walking, running, biking.	Assorted	Various	Reports, photos, social media	x	x	x	x	x	KFS & FKFCFA
Maintain & further develop existing picnic areas	Assorted	Various	Photos, reports	x	x				KFS & FKFCFA
Provide additional playgrounds for children	Assorted	Various	Photos, reports	x	x				KFS & FKFCFA
Explore establishment of a Karura Forest Visitor Centre	1	1	Photos, reports			x			KFS & FKFCFA
Develop a MapApp for Karura	No	1	Reports	1					FKFCFA, ESRI
Organise regular scheduled, educational theme walks in the forest aiming in particular at the lucrative tourist market	No	10	Reports, photos	2	2	2	2	2	KFS, FKFCFA
Develop & maintain the forest infrastructure to a high international standard	Assorted	Various	Reports, photos	x	x	x	x	x	KFS & FKFCFA

5.5. ENVIRONMENTAL EDUCATION AND RESEARCH PROGRAMME

5.5.1. Programme purpose

To make Karura an accessible conservation forest readily available to all for purposes of education and research

5.5.2. Background

Considerable research work has already been conducted in Karura Forest by various organizations which include NMK, various local and international universities and research institutions. Preliminary educational awareness programmes have been launched successfully.

5.5.3. Management issues

- Insufficient visibility of Karura as an opportunity for environmental education
- Insufficient scientific knowledge base about the forest ecosystem

5.5.4.

5.5.5. Management objective

To make Karura a rich source of education and research opportunities for all.

Table 18: Summary of management actions for Environmental Education and Research

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE
				1	2	3	4	5	
Objective: To promote environmental education and research in forestry									
Environmental Education									
Promote school-visit programmes to the forest e.g. through subsidized payments	No	500	Records	100	100	100	100	100	KFS & FKFCFA
Develop knowledge products about the natural history of the forest to be displayed in relevant locations like posters, documentaries	No	3	Report, photos			1	1	1	KFS & FKFCFA
Enhance linkages with universities and research institutions to encourage research work in the forest e.g. through internships	No	5	Reports, contacts	1	1	1	1	1	KFS & FKFCFA
Promote the use of Karura based educational tools	Assorted	Various	Report,	x	x	x	x	x	FKFCFA
Establish the education centre	No	1	Report, photos					1	KFEET, KFS, FKFCFA
Carry out Eco-Tour programme of on-demand educational theme walks	No	On demand	Reports, photos, media comments	x	x	x	x	x	FKFCFA
Research									
Undertake biodiversity surveys of eg.Plants, reptiles, butterflies and birds in Karura	No	5	Reports			1			KFS, FKFCFA, KWS, NMK, SACK
Initiate analyses of 8-years’data from FKFCFA camera trap (KaruraKam) concerning Karura’s wildlife species	Assorted	5	Reports, sci. papers, PR materials	x	x	x	x	x	FKFCFA, SACK
Continue 7-yr data stream from Colobus monitoring;	Assorted	5	Reports, sci. papers, PR materials	x	x	x	x	x	FKFCFA, SACK
Establish baseline data of mammal population dynamics from ad hoc mortality observations, KaruraKam	Assorted	5	Reports, sci. papers, PR materials	x	x	x	x	x	FKFCFA, SACK
Implement a weather station (rainfall, temperature, barometric pressure, etc.) for Karura	No	1	Reports, data stream	1					KFS, FKFCFA, Kenya Met. Dept., SACK
Update the official Karura Map with topography and new features	No	1	Reports	1					KFS, FKFCFA, ESRI-EA
Update the ESRI M-App to be in concordance with above	No	1	User feedback	1		1		1	FKFCFA, ESRI-EA

5.6. INFRASTRUCTURE AND EQUIPMENT PROGRAMME

5.6.1. Programme purpose

Karura forest to have a sound infrastructure and reliable equipment to serve the wide range of community needs

5.6.2. Background

Karura forest is unique not only in its location (so close to the centre of Nairobi) but also for other reasons such as its scenic sites, examples of good tree management and kilometres of attractive walks. The forest is already producing substantial revenue from visitors and events in the forest. The movement of visitors in the forest requires a good, well-maintained network of tracks and trails and accompanying infrastructure (See Figure 4 on page 15).

5.6.3. Management issues

- To have an adequate and well-maintained infrastructure to cope with the high number of monthly visits to the forest.
- To leverage adequate funding to improve housing for KFS security staff

5.6.4. Management objective

To provide, improve, and maintain appropriate infrastructure and equipment.

Table 19: Summary of management actions for the Infrastructure and Equipment Programme

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE
				1	2	3	4	5	
Objective: To have in place the necessary infrastructure and equipment									
MAINTENANCE									
Maintain the office block and gates	Assorted	Various	Report, photos,	x	x	X	x	x	KFS & FKFCFA
Maintain vehicles and equipment	Assorted	Various	Reports	x	x	X	x	x	KFS & FKFCFA
HOUSING									
Construct housing for Karura Station Manager	No	1	Photos	1					KFS & FKFCFA
Extend Karura Forest House office space	No	1	Photos	1					
Construct 12 housing units for 12 rangers assigned to Karura Forest Station	No	12	Photos, records		4	4	4	4	KFS & FKFCFA
Secure funding to move the rangers' village from inside the forest to HQ	No	34	photos		x	x	x	x	KFS & FKFCFA
TOILETS									
Construct a toilet for physically challenged at Sigiria	No	1	Photos		1				KFS & FKFCFA
Construct flush washrooms at Ruaka Picnic Site	No	1	Photo		1				KFS & FKFCFA
Construct latrines in strategic areas in the forest	No	5	Photos	2	2	1			KFS & FKFCFACFA

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE
				1	2	3	4	5	
Construct showers at Amani, Sharks, Sigiria	No					1	1	1	KFS & FKFCFA through outsourcing
TRACKS AND TRAILS									
Maintain forest roads and tracks	Km	15	Photos	x	x	X	x	x	KFS & FKFCFA
Improve the main forest road from the Limuru road to KFEET	Km	1	Photos					1	KFS & FKFCFA
Install metal railings along the waterfall trail	Km	500m	Photos	250	250				KFS & FKFCFA
Construct a footbridge over the Limuru road to link the main block and Sigiria	No	1	Photos					1	KFS & FKFCFA
Renew signage as necessary	No	Various	Photos	x	x	X	x	x	KFS & FKFCFA
GATES									
Open new gate with all facilities on the Peponi side of the forest	No	1				1			KFS & FKFCFA
Rebuild the gatehouse at Gate A (Limuru road) and Gate-C at Kiambu Road	No	2	Photos	1	1				KFS & FKFCFA

5.7. HUMAN RESOURCES PROGRAMME

5.7.1. Programme purpose

To provide a dedicated and competent staff to support efficient and effective plan implementation.

5.7.2. Background

The current staff at Karura station is listed Tables 9 and 10 of section 2.5.4 above. It is expected that with the implementation of this plan, more job opportunities for the local communities will be created and equally the strength of KFS staff will be raised to an optimal level to meet the challenges.

5.7.3. Management objective

To develop a cadre of dedicated and competent staff

Table 20: Summary of management actions for the Human Resources Programme

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE ORGANISATION(S)
				1	2	3	4	5	
Objective: To provide for optimum human resources for implementing the management plan									
Provide regular training programs for all staff including forest security and protection, customer relations and communication, firefighting, first aid, etc.	No	5	Reports, photos	1	1	1	1	1	KFS & FKF
Recruit staff as and when needed	No	Various	payroll	x	x	x	x	x	KFS & FKF

6. PLAN IMPLEMENTATION AND FINANCIAL MANAGEMENT

6.1. FINANCIAL MANAGEMENT

The financial management of the KPFMP is structured in accordance with the Forest Management Agreement between KFS and FKFCFA of 26 April 2021.

KFS provides the Karura forest station staff and FKFCFA contracts the rest of the staff in Table 15 and all service providers. Revenue streams have been diversified from simple gate collection to events with a new venue added and five improved picnic sites.

Financial supervision is carried out through the joint committee reviewing accounts monthly and approving all financial transactions.

Revenue generation within Karura for the period 2016-2020 is shown in the tables and graph below. Proposed programmes and activities are aimed at maintaining the revenue base from the forest ecosystem.

Table 21: Karura forest station revenue collection for the period 2016 to 2020

Year	Total
2015/16	1,726 121
2016/17	2,981 883
2017/18	3,715 085
2018/19	2,766 521
2019/20	896,038 - July to Dec. 2019
2020/21	2,085,906 – July 20 to May 21
Total	14,171,554

Table 22: Revenues from gates, picnics and other events

Year	Total
2015	35,270,640
2016	50,604,392
2017	60,601,539
2018	65,950,008
2019	82,736,099
2020	97,006,932 – Apr 20 to Mar.21
Total	392,169,610

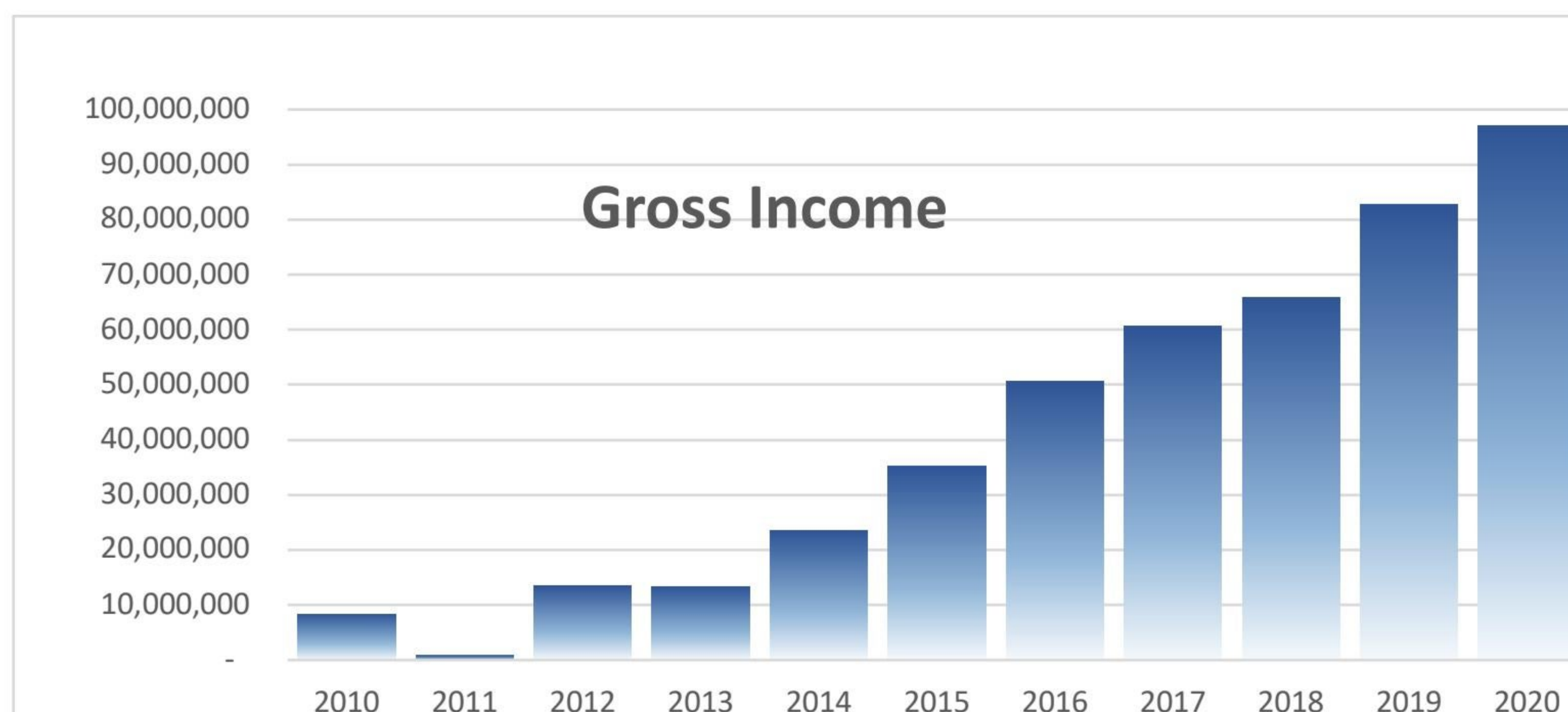


Figure 8. Gross annual income to Karura Forest 2010-2020

Table 23: Revenue projections 2020 -2024

Source	2021	2022	2023	2024	2025
Gate collections	80,000,000	80,000,000	80,000,000	80,000,000	80,000,000

Tables 22 and 33 and Figure 8 indicate an upward trend in revenue collection and are an indication of the success of the 2016-2020 P KPFMP. A continued increase in revenue collection is expected by implementing the improvements proposed in this plan.

A brief list of the immediately foreseen cost centres and potential sources of revenue are listed hereunder.

6.1.1. Areas of expenditure

Forestry activities:

- a) Forest regeneration.
- b) Planting of bamboo along the rivers and shrubs along the tracks.
- c) Removal of *Lantana camara*, *Mauritius thorn* and other invasive species throughout the forest.

Infrastructure maintenance & security:

- a) Maintenance of infrastructure including the fence.
- b) Maintenance of vehicles.
- c) Fire tower.

Human Resources management

- a) Payroll.
- b) Contractors.

Karura Forest projects:

- a) Construct 12 Ranger Houses.

- b) Construct housing for Karura Forest Station Manager.
- c) Create additional office space for Karura Forest House.

6.1.2. Sources of income:

- a) Entrance and parking fees.
- b) Picnics.
- c) Events.
- d) Photo shoots.
- e) Guided walks.

At present, it is not possible to provide exact figures for the above costs and revenues as the fundraising situation is very fluid.

The same fundraising strategy as before will be pursued according to the objectives and actions featured in this PKPFMP.

KFS and FKFCFA through the Joint Management Committee and the collaborating stakeholders are committed to adhering strictly to the following guiding principles for the duration of the 5-year plan:

- a) To operate and maintain an efficient running programme for the plan.
- b) To be accountable to KFS, CFA membership and donor.,
- c) To be mindful of the needs of the most vulnerable members of communities using the forest.
- d) To practice a transparent process for all decision making and accountability.
- e) To be always available for communication and discussion, open to ideas, suggestions, and advice from others.

6.2. ENVIRONMENTAL IMPACT ASSESSMENT

Manipulation of an ecosystem results in negative impacts affecting the dynamics of the system and its ability to supply goods and services. Environmental impact assessment identifies these negative impacts and provides means of mitigation for the welfare of human and other species dependent on such ecosystems. It provides a mechanism on project planning, implementing, and integrating environmental conservation, management, and development. It takes cognizance of the social, physical, and biological component of the environment to ensure minimal negative impacts as well as promoting environmental benefits. EIA should be carried out for all proposed major development activities within the ecosystem to identify negative impacts and their mitigation measures as guided by EMCA, 1999 (Amended 2015).

Table 24: Summary of negative impacts and mitigation measures of planned activities

Development/ activity	Negative impacts	Mitigation measures
Construction of roads, buildings etc.	Environmental pristine alteration Vegetation destruction. Noise pollution	Should blend with the environment Proper disposal of building waste
Establishment of recreational sites and nature trails	Vegetation destruction Wildlife disturbance and displacement	Picnic sites should be accessed via nature trails if inside forested areas Picnic sites should have no off-road drives Along nature trails, no tree cutting should be done, except clearing of undergrowth along them Picnic sites should have litter bins
Development of access roads	Vegetation destruction Soil erosion Wildlife disturbance and displacement Wildlife breeding sites destroyed	Proper road alignment must be done Reduce vegetation destruction as much as possible Old roads or tracks in the forest should be maintained with minimal environmental disturbance Good drainage and reduced soil erosion should be ensured

6.3. PLAN MONITORING AND EVALUATION

6.3.1. Background

Monitoring and evaluation of the management plan are essential since it provides a basis for correction, adjustment, and improvement to the proposed goals, targeted activities and assessment of the achievements attained. During this stage, problems encountered in the implementation of planned activities are identified and strategies to address them outlined. Notwithstanding, a reflection of the past is made in a bid to making the future successful.

6.3.2. Method

A five-year Monitoring and Evaluation Plan will be formulated and reviewed regularly during the plan period. A mid and end-term evaluation will be carried out to assess progress in the implementation of planned activities, the achievement of objectives, and analyze and address constraints encountered in the process. It will also provide essential information that can be used in revising the management plan. It is also proposed that GIS technology will be used for M & E and reporting the forest trends, including development of Applications (Apps) for different activities.

Continuous monitoring during the implementation period will be maintained through preparation and submission of monthly, quarterly, half-year and annual progress reports from the JMC to the HOC.

6.3.3. Responsibilities

The KPFMP monitoring, evaluation and reporting may be undertaken either internally or externally. Internal monitoring should be encouraged to involve the participation of the forest adjacent communities and other stakeholders, who may assist in assessing their progress on each of the program's activity implementation levels, which can be used for project evaluation. External monitoring is preferred where technical requirements are

needed and should be undertaken in consultation with the community, key stakeholders and other implementing agencies.

To implement the management plan efficiently, the following monitoring activities are intended to be implemented,

- Security will be provided by the KFS rangers and community scouts on a 24-hour basis, through daily patrolling of the fence and forest.
- Regular visits and spot checks will be organized for the security team.
- Periodic meetings (monthly) of the Joint Forest Management Committee will be convened.
- A mid-term forum will be held (to which the Karura Forest stakeholders will be invited) to review progress made towards the goals spelt out in the management plan.

6.3.4. Success indicators

Success indicators provide a measure of assessing whether set targets are being achieved. Success indicators will be agreed upon between the lead agencies for different categories of management activities to assess the achievement of the set targets for each activity in the management plan.

6.3.5. Proposed management actions

- Develop monitoring guidelines (monitoring team and stakeholders).
- Monitor impact of the forest use (monitoring team and stakeholders).
- Monitor the implementation of plan programmes (monitoring team and stakeholders).

Table 25: Monitoring indicators

Programmes	Indicators of success	Means of verification	Assumptions
Natural forest management	<ul style="list-style-type: none"> • State/quality of the natural forest. • No. of indigenous seedlings sown. • Area replanted by indigenous tree species. • Area rehabilitated. 	<ul style="list-style-type: none"> • KFS and CFA records • Surveys. • KFS records. • Resource inventory. 	<ul style="list-style-type: none"> • The plan is implemented successfully. • Availability of resources.
Forest safety and security	<ul style="list-style-type: none"> • Incidences of illegal harvesting reported. • No. of arrests and prosecutions in a law court. • Performance of the forest guards and community scouts. • No. of forest fire incidents. 	<ul style="list-style-type: none"> • KFS, CFA and community scouts' records. • Police records. 	<ul style="list-style-type: none"> • The plan is implemented successfully. • Good working relationships among stakeholders. • Availability of fire fighting equipment.
Community and outreach	<ul style="list-style-type: none"> • No. and types of IGAs. • Composition of decision-making structure. • No. of NBEs. • Income generated from NBEs. • No. of people employed. • No. and type of technologies adopted. • No. of trainings held and exchange tours organized. • No. of visitors • Number of workshops organized • Number of field visits organized 	<ul style="list-style-type: none"> • CFA records. • Community management committees. • CFA financial records. • Site visits. • Minutes, visitors' book records and training records. 	<ul style="list-style-type: none"> • The plan is implemented successfully. • Good working relationships among stakeholders. • Availability of resources and markets.

Programmes	Indicators of success	Means of verification	Assumptions
Ecotourism	<ul style="list-style-type: none"> No of ecotourism activities established 	<ul style="list-style-type: none"> CFA records 	<ul style="list-style-type: none"> The plan is implemented successfully Success in ecotourism activities development.
Environmental education and research	<ul style="list-style-type: none"> No. of studies and surveys commissioned 	<ul style="list-style-type: none"> CFA records. CFA financial records. Site visits. Training reports, M&E reports. Minutes, visitors' book records and training records. M&E reports. Site visits. 	<ul style="list-style-type: none"> The plan is implemented successfully. Good working relationships among stakeholders. Availability of resources and markets.
Human resources	<ul style="list-style-type: none"> No. of trainings conducted No. of new staff recruited 	<ul style="list-style-type: none"> KFS and CFA records Payroll records 	<ul style="list-style-type: none"> The plan is implemented successfully. Good working relationships among stakeholders. Success in human resource development.

6.4. INSTITUTIONAL ARRANGEMENTS FOR PLAN IMPLEMENTATION

The successful implementation of the management plan necessitates the use of appropriate and integrated institutional and organizational structures that exist in the relevant institutions. The field organisation for the implementation of the plan at the forest station level will be implemented in accordance with the FMA by the JMC (see appendix 6). The JMC will provide a forum for dialogue, consensus building, priority setting, and balancing of the various interests involved. The Joint Management Committee comprises

- At least 3 Representatives from the KFS.
- At least 3 Representatives from the CFA.

This will assist the CFA in the implementation of the FMA.

A diagrammatic institutional framework showing how KFS and FKFCFA will work together and liaise with other stakeholders to implement this plan is shown in Appendix 6

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APPENDICES

APPENDIX 1: LIST OF PARTICIPANTS IN THE STAKEHOLDERS MEETING HELD ON 21ST FEBRUARY 2020

NO.	NAME	ORGANIZATION	PHONE NO.	EMAIL
1	Anthony Kinyanjui	KFS	721723989	akimani647@gmail.com
2	Cristina Boeckle	FKF	722204501	cboelcke@karurafriends.org
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19	Nancy Karugi	KFS	707880356	karuginancy@gmail.com
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21	Veronica Nyambura	NEW DAWN	721436198	
22	Emily Kitheka	KEFRI	726361238	emilykitheka@yahoo.com
23	Griffin Nkonge	FKF/KARURA	716578180	gnkongei@yahoo.com
24	Josephine Njoki	GUKENA	728268061	njokimararo@gmail.com
25	Dzimuji Kambarage	KFS	723739487	dzimuji@gmail.com
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27	Simon Ndungu	UMOJA	746157884	kagurusimon025@gmail.com
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32	Simon Ndungu	Umoja		33618407
33	Jacinta Njoki	Umoja		24788848
34	Pauline Wambui Karanja	Umoja		34173790
35	Rachael Njeri Ngugi	Mushroom		0552711
36	Teresiah Njeri Gitau	Mushroom		20327115
37	Serah Njoki Muthoni	Mushroom		23000592
38	Irene Njeri Wambui	Bluesky		21097516
39	Peter Maina Wanjiru	Bluesky		30170843
40	Jacinta Njoki Nganga	Bluesky		1897692
41	Muchina Joseph Kamau	Vision		24209887
42	Kanunwa Marion Nduta	Vision		13057468
43	Kimani Mary Wangui	Vision		21497283
44	Wanjiku Peris Wangari	Karuma		27612130
45	Mwangi Caroline Wangu	Karuma		30265426
46	Mugo Joseph Kamau	Karuma		35041568
47	Josephine Njoki Mararo	Gukena		28212738
48	Peter Wakaria Chege	Gukena		33982498
49	Minneh Wanjiru Njeri	Gukena		12762358
50	Daniel Mbao Kaguru	Newdawn		32372445
51	Risper Wangari Njagi	Newdawn		24834960
52	Pauline Wambui Mararo	Newdawn		24209914
53	Joseph Mwangi Kariuki	Amani		33999822
54	Anne Waithira Miringu	Amani		23010228
55	Mary Krisenzia Babu	Amani		27747637



Plate 11: FKFCFA Chairperson Dr. Winnie Kiiru addresses participants at Karura Community Stakeholders' Meeting on 21 February 2020



Plate 12: Participants at Karura Community Stakeholders' Meeting on 21 February 2020

APPENDIX 2: SMALL-MEDIUM MAMMALS FOUND IN KARURA FOREST

Order **Primates**

Superfamily: Cercopithecoidea (Old World Monkeys)

Subfamily: Cercopithecinae

Olive Baboon, *Papioanubis* (only two occasional sightings in five years — non-residents)

Family: Cercopithecidae (Cheek-pouched monkeys)

Subfamily: Cercopithecinae

Syke's Monkey (=Kolb's monkey), *Cercopithecus mitis kolbi*

Subfamily: Colobinae

Colobus Monkey (= Guereza Colobus, = Black and White Colobus), *Colobus guereza kikuyuensis*

Family: Galagonidae

Kikuyu Small-eared Galago (= Bushbaby), *Otolemurgarnettiikikuyensis*

Order Eulipotyphla — **Misc. Insectivores**

Family: Erinaceidae

White-bellied

Hedgehog, *Atelerixalbiventris*

Order Chiroptera — **Bats**

Family: Pteropodidae

Subfamily: Epomophorinae

Angolan Collared Fruit

Bat, *Myonycteris angolensis*

[Wahlberg's] Epauletted Fruit

Bat, *Epomophorus [wahlbergi]*

Order Lagomorpha — **Hares**

Family: Leporidae

Cape Hare, *Lepus capensis*

Order Rotentia — **Rodents**

Family: Sciuridae

Bush Squirrel, *Paraxerus* sp.

Family: Hystricidae

North African Crested

Porcupine, *Hystrix cristata*

Family: Nesomyidae

Subfamily: Cricetomyinae

Giant Pouched

Rat, *Cricetomysgambianus*

Order Carnivora — **Carnivores**

Family: Mustelidae

Subfamily: Mellivorinae

Ratel (= Honey Badger) *Mellivora capensis*

Family: Viverridae

Subfamily: Viverrinae

African Civet, *Civettictiscivetta*

Large-spotted Genet (= Blotched, =

Rusty-spotted), *Genetta maculata*

Family: Nandiniidae

African Palm Civet (= Two-spotted

Palm Civet), *Nandiniabiotata arborea*

Family: Herpestidae

Subfamily: Herpestinae

Egyptian Mongoose, *Herpestes*

ichneumon

Slender

Mongoose, *Herpestessanguineus*

White-tailed

Mongoose, *Ichneumiaalbicauda*

Family: Mustelidae

Subfamily: Lutrinae

African Clawless Otter, *Aonyx*

capensis

Family: Canidae

Side-striped Jackal, *Lupulellaadusta*

Order Artiodactyla — **Even-toed Ungulates**

Family: Suidae

Bush Pig, *Potamochoeruslarvatus*

Family: Bovidae

Subfamily: Bovinae

Bushbuck, *Tragelaphus scriptus*

Subfamily: Cephalophinae

Harvey's Duiker, *Cephalophusharveyi*

Subfamily: Neotraginae

Suni, *Neotragusmoschatus*

APPENDIX 3: INDIGENOUS TREES IN KARURA FOREST

Family	Latin Name	Common Name	Local Name	Uses	Remarks
Fabaceae	<i>Acacia kirkii</i>	Kirk's acacia	Ol-lerai, Kimwea	Medicinal, firewood	Indigenous
Passifloraceae	<i>Adeniametriosiphon</i>			Ornamental	Indigenous, Rare & Endemic to Kenya
Rubiaceae	<i>Afrocanthiumkeniense</i>			Firewood	Indigenous, Rare & Endemic to Kenya
Fabaceae	<i>Albizia coriara</i>	Giant albizia	Lober, Omubele	Timber and medicinal	Indigenous
Fabaceae	<i>Albizia gummifera</i> var. <i>gummifera</i>	Peacock Flower	Mukurue	Timber & medicinal	Indigenous
Fabaceae	<i>Albizia schimperiana</i> var. <i>schimperiana</i>	Long-podded albizia	Mukurue	Timber	Indigenous
Sapindaceae	<i>Allopyllus</i>	Allophyllus		Boxes and bee-hive making	Indigenous, Native to East Africa
Metteniusaceae	<i>Apodytesdimidiata</i>	White pear		Ornamental	Indigenous, Native to S. Africa, Kenya
Araceae	<i>Archontophoenixalexandrae</i>	Alexander Palm		Native to Eastern Australia	Exotic
Asteraceae	<i>Brachylaenahuillensis</i>	Silver Oak	Muhugu	Timber & firewood	Indigenous
Phyllanthaceae	<i>Bridelia micrantha</i>	Black sweetberry	Mukoigo	Timber & medicinal	Indigenous
Myrtaceae	<i>Callistemon citrinus</i>	Bottlebrush Tree		Ornamental	Exotic
Rutaceae	<i>Calodenrumcapense</i>	Cape Chestnut	Mucarage	Timber & ornamental	Indigenous
Bombacaceae	<i>Ceiba speciosa</i>	Bombax		Ornamental	Exotic
Ulmaceae	<i>Celtis africana</i>	White Stinkwood	Murundu	Timber	Indigenous
Araceae	<i>Chrysalidocarpusluctescens</i>	Golden Cane Palm	Butterfly Palm		Exotic, Native to Madagascar
Sapotaceae	<i>Chrysophyllumviridifolium</i>	Murundu	Munugungu	Timber	Indigenous
Rutaceae	<i>Clausenaanisata</i>		Muthathi	Medicinal	Indigenous
Malvaceae	<i>Cola greenwayi</i> var. <i>keniesis</i>	Hairy cola	Muthakai	Timber	Indigenous
Burseraceae	<i>Commiphoraaminii</i> ssp. <i>zimmermannii</i>		Mutongoga	Live fence posts	Indigenous
Boraginaceae	<i>Cordia africana</i>	Large-leaved cordia	Muringa	Timber & edible fruit	Indigenous
Fabaceae	<i>Craibiabrownii</i>	Hard peawood	Mukumbu	Timber	Indigenous

Euphorbiaceae	<i>Croton alienus</i>	Muthenia		Firewood	Indigenous, Rare
Euphorbiaceae	<i>Croton megalocarpus</i>	Croton	Mukinduri	Timber	Indigenous
Zamiaceae	<i>Cycas revoluta</i>	King Sago Palm	Sago Cycad		Exotic, Native to Southern Japan
Zamiaceae	<i>Cycas thoursii</i>	Madagasca Cycad			
Poaceae	<i>Dendrocalamus giganteus</i>	Giant bamboo		Construction	Exotic
Ebenaceae	<i>Diospyros abyssinica</i>	Lusui	Muiruthi	Timber	Indigenous
Asparagaceae	<i>Dracaena steudneri</i>	Steudner's dracaena	Muthari	Ornamental	Indigenous
Putranjivaceae	<i>Drypetesgerrardii</i>		Munyenye	Timber	Indigenous
Meliaceae	<i>Ekebergia capensis</i>	Ekebergia	Mununga	Timber	Indigenous
Meliaceae	<i>Ekebergiarupelliana</i>	Ekebergia		Timber	Indigenous
Celastraceae	<i>Elaeodendronbuchananii</i>	Moth tree	Mutanga	Timber	Indigenous
Euphorbiaceae	<i>Erythrococcafischeri</i>	Chesiseiyey		Arrow shafts	Indigenous
Fabaceae	<i>Erythrina abyssinica</i>	Red Hot Poker Tree	Muhuti	Timber & medicinal	Indigenous
Ebenaceae	<i>Eucleadivinorum</i>	Euclea	Mukinyei	Timber & medicinal	Indigenous
Euphorbiaceae	<i>Euphorbia candelabrum</i>	Kithuri	Mububungu	Medicinal & ornamental	Indigenous
Euphorbiaceae	<i>Euphorbia compacta</i>		Watha	Ornamental	Indigenous, Rare
Rutaceae	<i>Fagaropsisangolensis</i>	Mafu	Mukaragati	Timber	Indigenous
Moraceae	<i>Ficus sur</i>	Cape fig	Mukuyu	Timber, medicinal & edible fruit	Indigenous
Moraceae	<i>Ficus thonningii</i>	Strangler fig	Mugumo	Fibre, ceremonial & edible fruit	Indigenous
Rubiaceae	<i>Gardenia ternifolia</i>	Large-leaved gardenia		Tool handles, medicinal	Indigenous
Malvaceae	<i>Grewia similis</i>		Mutheregendu	Timber, Edible Fruit	Indigenous
Meliaceae	<i>Khaya anthotheca</i>	East african mahogany		Timber	Indigenous, VULNERABLE
Salicaceae	<i>Ludiamauritiana</i>		Mfuwate	Timber	
Sapotaceae	<i>Manilkara discolor</i>	Forest milkberry	Mugambera	Timber, edible fruit	Indigenous
Bignoniaceae	<i>Markhamia lutea</i>	Markhamia	Muu	Timber	Indigenous
Celastraceae	<i>Maytenus heterophylla</i>		Muthuthi	Roots edible	Indigenous

Fabaceae	<i>Millettia dura</i>	Millettia	MuhatiaMubatia	Timber, Durable wood for poles	Indigenous
Sapotaceae	<i>Mimusops kummel</i>			Timber, medicinal	Indigenous
Moringaceae	<i>Moringa stenopetala</i>	Moringa	Lorsanjo	Medicinal, water purifier	Indigenous
Fabaceae	<i>Newtoniabuchananii</i>	Newtonia	Mukui	Timber	Indigenous
Oleaceae	<i>Olea capensis</i>	black ironwood		Ornamental, Firewood	Indigenous, Native to sub-saharan Afr.
Oleaceae	<i>Olea europaea ssp. Cuspidata</i>	Wild Olive	Mutheru, Muthamayu	Timber, medicinal & edible fruit	Indigenous
Santalaceae	<i>Osyris lanceolata</i>	East African Sandalwood	Muthithi	Medicinal, edible fruit	Indigenous, ENDANGERED
Rubiaceae	<i>Oxyanthusspeciosus ssp. stenocarpus</i>	Whipstick tree	Lusiliru	Firewood	Indigenous
Podocarpaceae	<i>Podocarpus falcatus</i>	East african yellowwood	Muthengera	Timber	Indigenous
Araliaceae	<i>Polysciaskikuyuensis</i>	Parasol tree	mutati	Soft wood for box making	Indigenous
Sapotaceae	<i>Pouteria adolfi</i>	Muna tree		Timber	Indigenous
Rosaceae	<i>Prunus africana</i>	Red Stinkwood	Muiru	Timber & medicinal	Indigenous
Myrtaceae	<i>Psidium guajava</i>	Guava Tree	Mubera	Edible Fruit	Exotic
Myrtaceae	<i>Syzygiumguineense</i>	Waterberry	Mukoe	Edible Fruit, Poles	Indigenous
Salicaceae	<i>Rawsonia lucida</i>	Rawsonia	Mutendera	Timber, edible fruit	Indigenous
Anacardiaceae	<i>Rhus glaucescens</i>		Muthigio	Edible Fruit	Indigenous
Rubiaceae	<i>Rothmanniaurcelliformis</i>	Forest rothmannia	Mukombokombo	Firewood	Indigenous
Phyllanthaceae	<i>Sapiumellipticum</i>	Milk tree	Muhathi	Timber	Indigenous
Anacardiaceae	<i>Schinusmolle</i>	Pepper Tree	Mugaita	Ornamental	Exotic
Oleaceae	<i>Schreberaalata</i>	Wing-leaved wooden pear	Mutoma	Hardwood, durable	Indigenous
Fabaceae	<i>Senna spectabilis</i>	Cassia	Mwenu	Timber & ornamental	Exotic
Bignoniaceae	<i>Spathodeacampanulata</i>	Nandi Flame	Sebetaiyet	Timber & medicinal	Indigenous
Loganiaceae	<i>Strychnosusambarensis</i>		Mutikani	Firewood	Indigenous
Apocynaceae	<i>Tabanaemontanastapfiana</i>	Wild magnolia	Mwerere	Ornamental, edible fruit	Indigenous

Combretaceae	<i>Terminalia mantaly</i>	Umbrella Tree		Ornamental	Exotic
Fabaceae	<i>Tipuanatipu</i>	Tipu Pride of Bolivia		Timber, ornamental	Exotic
Rutaceae	<i>Toddalia asiatica</i>		Mururue	Medicinal	Indigenous
Meliaceae	<i>Trichiliaemetica</i>	Natal Mahogany	Mururi	Timber & medicinal	Indigenous
Annonaceae	<i>Uvariadendron anisatum</i>		Mutonga	Walking sticks	Indigenous, Rare
Rutaceae	<i>Veprishanangensis</i> var. <i>unifoliolata</i>		Munderendu	Timber	Indigenous, Rare: Karura Endemic
Rutaceae	<i>Veprissimplicifolia</i>	Teclea	Munderendu	Timber & medicinal	Indigenous
Rutaceae	<i>Vepristrichocarpa</i>		Munderendu	Timber & medicinal	Indigenous
Lamiaceae	<i>Vitex keniensis</i>	Meru Oak	Muuru	Timber	Indigenous
Canellaceae	<i>Warburgiaugandensis</i>	East African Greenheart	Muthiga	Timber & medicinal	Indigenous
Rutaceae	<i>Zanthoxylum gellettii</i>	East african satinwood	Sagawoita	Timber, medicinal	Indigenous

APPENDIX 4: KENYA FOREST SERVICE (KFS) AND FRIENDS OF KARURA FOREST (FKFCFA) - STAKEHOLDER ENGAGEMENT POLICY FOR TREE PLANTING IN KARURA FOREST

1. Context

KFS and FKFCFA are looking for greater stakeholder participation in Forestry conservation and tree planting. KFS and FKFCFA have established guidelines to engage stakeholders at various levels to ensure a win-win situation where the goals of stakeholders are met at the same time recognizing KFS /FKFCFA inputs

2. KFS and FKFCFA Authority, Branding and Recognition

- All engagements of the set guidelines will be covered, if necessary, by a signed agreement
- KFS and FKFCFA will be consulted and involved at all times on the planned arrangement and progress thereafter.
- KFS and FKFCFA will delegate technical KFS and FKFCFA staff to provide all technical support for intended tree planting engagements
- All publicity activities e. g press release, media briefings etc on engagement must involve all entities to the engagement and information circulated prior to events
- For launch activities, KFS and FKFCFA must be involved in the entire process and provided with a platform to contribute in the event, e.g., CCF KFS and Chair FKFCFA make a speech. KFS and FKFCFA exhibit its products. KFS and FKFCFA logo and slogan must be used in all communications regarding engagement by example in brochures, flyers, billboards, banners and all forms and types of communications related to the event including mentions on radio and other electronic media communication.

3. KFS and FKFCFA Contribution

- KFS and FKFCFA shall arrange to undertake all necessary measures to ensure the success of the agreements.

4. Tree planting

- KFS and FKFCFA will make available a site for the tree planting exercise, will prepare the site for tree planting, will provide the trees for planting (from the Karura Nursery and the FKFCFA nursery) and will ensure aftercare of trees (for no less than three years) to guarantee their survival.
- The cost to do all the above will be KSH 450 per tree to be revised from time to time. Cheques to cover the tree planting expenses need to be made out in advance to FKF & KFS Karura Forest Joint Account.

APPENDIX 5: PROPOSED FELLING PLAN FOR KARURA FOREST PLANTATIONS

Proposed Felling Plan for Karura Forest Plantations

The total area for Eucalypts species is 308.6 Ha. The management purpose is fuel wood production

Annual Allowable cut = Total area ÷ Rotation age

Rotation age = (First crop rotation + coppice rotation) ÷ 2

$$= (12+8) \div 2$$

$$= 20 \div 2$$

$$= 10$$

Annual Allowable cut for the 10 year period = $308.6 \div 10$

$$= 30.86 \text{ Ha per year for the next 10-year period}$$

Eucalypts to be felled for the next five years = 154.3 Ha.

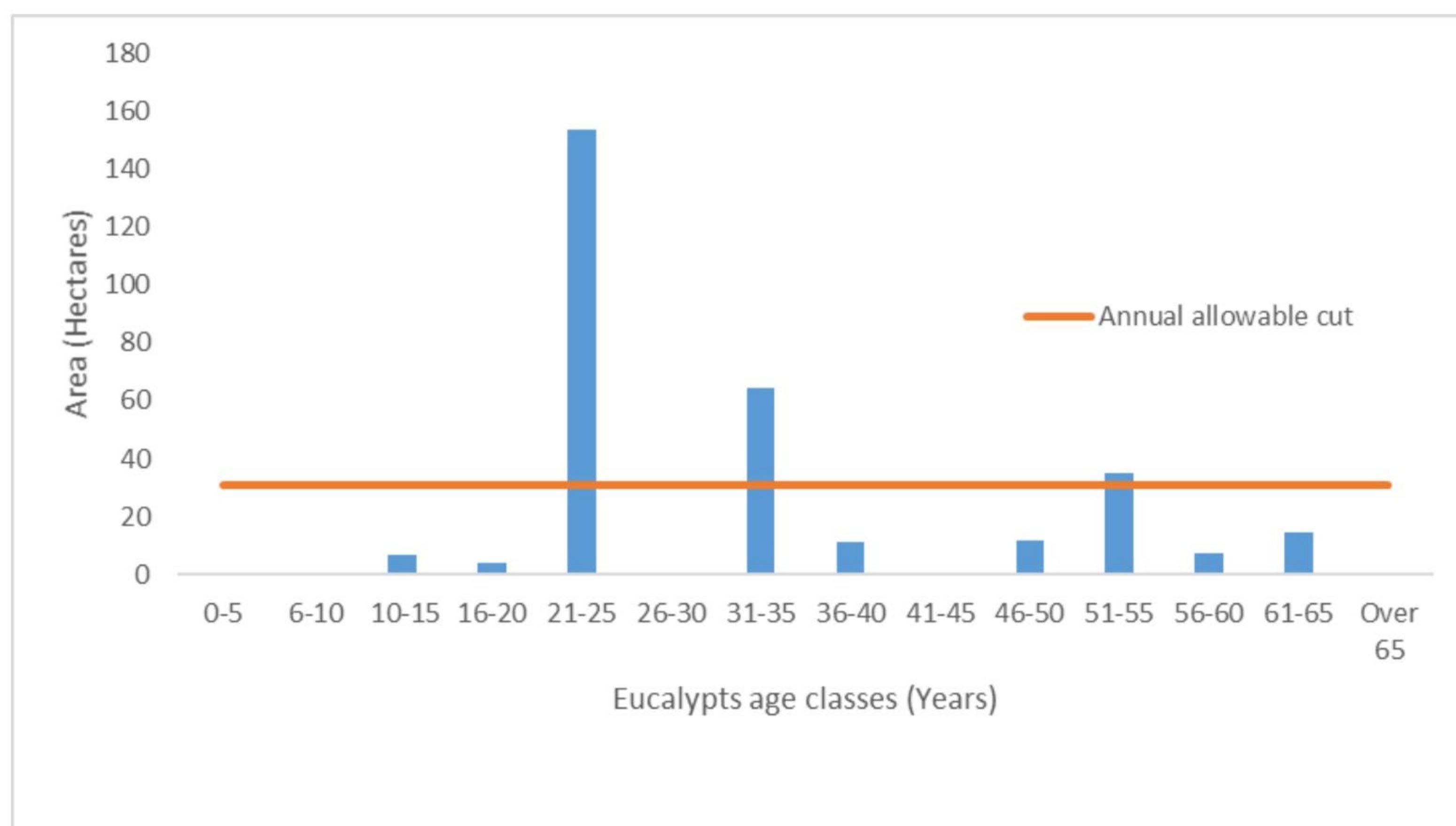


Figure A6.1: Age classes of the Eucalypts and annual allowable cut.

Age class distribution based on the age of the Eucalypts crops in Karura forest.

Proposed Sub-compartments to be clear-felled

While the norm as illustrated in figure 7 would be the scientific way to proceed, several factors influenced the proposed sub-compartments to be clear felled, namely,

- The availability of funds to undertake the harvesting operations. The FKF don't quite have the capacity to undertake the clear felling operations as informed by the annual allowable cut.
- There were concerns that removing such a huge amount of the plantations would have detrimental impacts on the aesthetic value of Karura forest. Thus it was

recommended to undertake the reversion of the plantation areas to indigenous forest on a more gradual pace to mitigate against any negative impacts.

Based on these concerns, the following 11 sub-compartments were suggested to be reverted to indigenous in the next five years.

Table A6.1: Proposed felling plan for Karura Forest

Area	Size (Ha)	Year to be reverted to indigenous	Remarks
Karura 38A	9.5	2020	This is a continuation of the scheduled reversion from the previous plan which was yet to be completed. It is occupied by <i>Acacia mearnsii</i> with scattered <i>Eucalyptus saligna</i> and <i>Eucalyptus paniculata</i> .
Karura 38B	4.3	2020	
Karura 14A	13.7	2021	Consists of mostly <i>Eucalyptus saligna</i> and <i>Eucalyptus paniculata</i> with a variety of indigenous trees. It is a neglected sub-compartment with multiple shoots springing from single trees (no coppice reduction done)
Karura 12B	1.9	2021	Consists mainly of <i>Eucalyptus paniculata</i> with mixed indigenous trees
Karura 12C	2.2	2022	
Karura 12E	4.7	2022	
Karura 30A	9.5	2023	This neighbours the KTTC, and consists of <i>Eucalyptus paniculata</i> , <i>Eucalyptus saligna</i> with mixed indigenous trees. Has a thick grass undergrowth
Karura 30F	9.3	2022	These two are opposite Karura 30F. consist of <i>Eucalyptus paniculata</i> , <i>Eucalyptus saligna</i> with a variety of indigenous trees.
Karura 30C	7.1	2023	
Sigiria 45A	7.2	2024	This has partly been reverted to indigenous. Mostly consists of <i>Eucalyptus saligna</i> mixed with <i>Eucalyptus</i>

			<i>paniculata</i> . Many dead trees observed caused by soil pathogens and cankers. The site is characterized by a high bedrock and rocky soils, which most of the trees can't penetrate causing their eventual deaths.
Sigiria 48A	5.6	2024	Consists of mostly <i>Eucalyptus paniculata</i> and <i>Eucalyptus saligna</i> with a rich undergrowth. Many dead trees caused by cankers.
TOTAL	75		

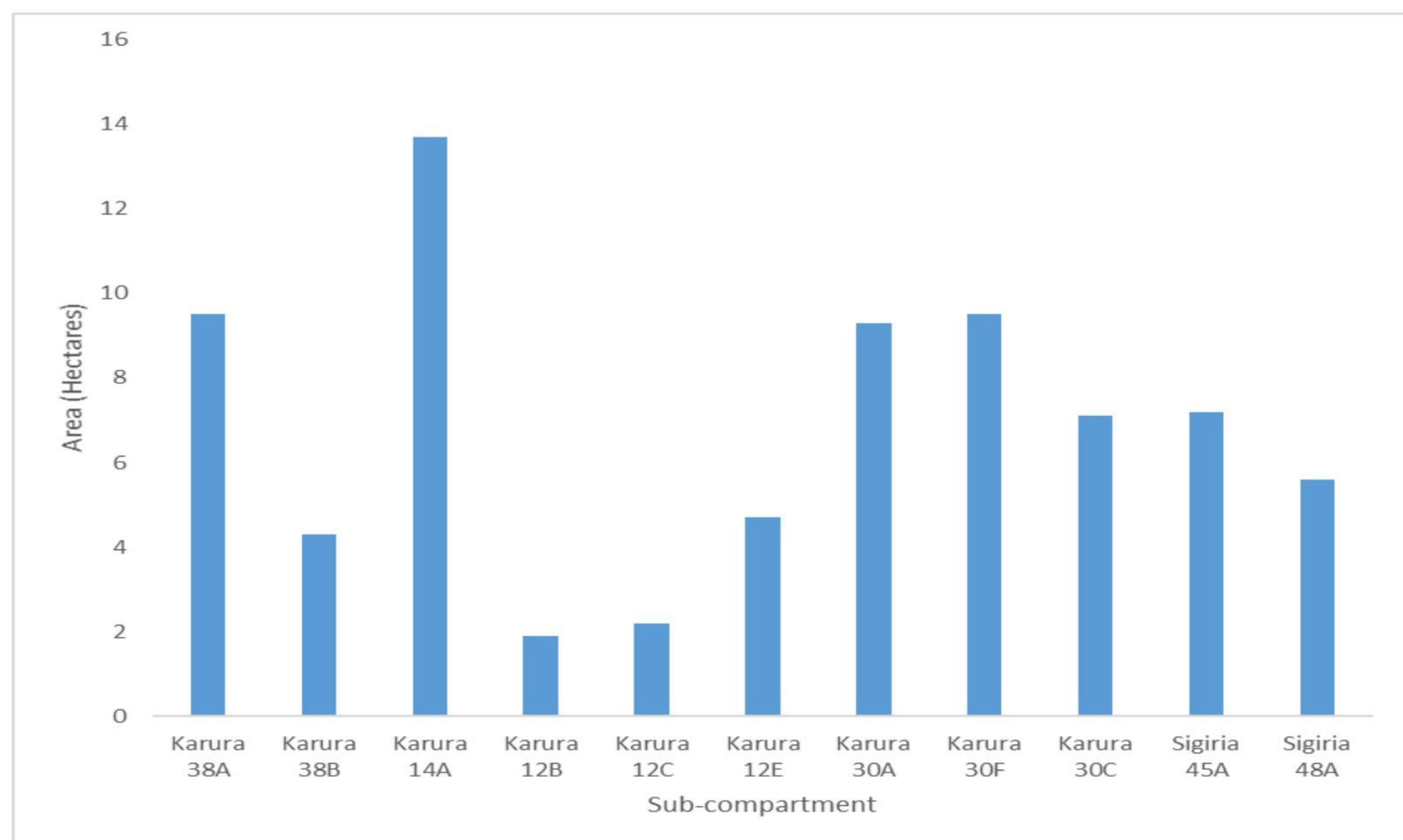


Figure A6-2: Proposed sub-compartments to be reverted to indigenous forest (2020-2024)

APPENDIX 6: INSTITUTIONAL ARRANGEMENTS FOR PLAN IMPLEMENTATION

